Number/
Numéro

1

Province of British Columbia

Province of Alberta

Province of Saskatchewan

Province of Manitoba

WESTERN CANADA
HEALTH MANPOWER TRAINING STUDY

SECTION III - CATEGORY 1 REPORTS

- OPTOMETRY
- CHIROPRACTIC
- PODIATRY/CHIROPODY
- OPHTHALMIC DISPENSING
- CERTIFIED PROSTHETISTS AND ORTHOTISTS

Province of
British Columbia

Province of
Alberta

Province of
Saskatchewan

Province of
Manitoba

WESTERN CANADA
HEALTH MANPOWER TRAINING STUDY

Section III - Category # 1 - Report A

THE SCOPE OF EXISTING TRAINING PROGRAMS
Category # 1 OCCUPATIONS

SECTION III - REPORT I-A

THE SCOPE OF EXISTING TRAINING PROGRAMS CATEGORY #1 - OCCUPATIONS

JANUARY, 1981

Report I - OPTOMETRY

THE SCOPE OF EXISTING TRAINING PROGRAMS

CATEGORY #1 OCCUPATIONS

TABLE OF CONTENTS

		PAGE
1.0	Introduction	1
2.0	Training Programs for Optometry	2
3.0	Training Programs for Chiropractic	5
4.0	Training Programs for Podiatry/Chiropody	7
5.0	Training Programs for Ophthalmic Dispensing	8
6.0	Training Programs for Certified Prosthetists and Orthotists	10

THE SCOPE OF EXISTING TRAINING PROGRAMS
CATEGORY #1 - OCCUPATIONS

I.0. INTRODUCTION

In this paper, we review the scope of existing training programs in Western Canada for category #1 occupations. The paper is divided into five sections:

- 2.0 - Optometry
- 3.0 - Chiropractic
- 4.0 - Podiatry/Chiropody
- 5.0 - Ophthalmic Dispensing
- 6.0 - Orthotists/Prosthetists

Within each section we discuss existing training programs by province, and summarize these programs for the Western region. In addition, we review the training programs provided in the other provinces of Canada.

Exhibit 1 - School of Optometry - University of Waterloo - Enrolments by Province 1970-1980[1]

Province	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980
Western Canada Region											
British Columbia	3	2	3	2	4	2	1	1	3	3	5
Alberta	4	5	5	4	3	5	5	6	7	8	5
Saskatchewan	4	4	1	4	3	4	4	5	6	3	2
Manitoba	4	2	0	4	1	3	3	1	1	2	3
Western Region Sub Total	15	13	9	14	11	14	13	13	17	16	15
Ontario	40	41	44	41	46	40	41	40	40	35	34
Quebec	3	2	-	-	1	-	-	2	1	-	4
Eastern Canada Region											
New Brunswick	-	2	1	4	1	5	3	2	1	4	5
Nova Scotia	1	-	1	-	1	-	-	1	-	2	1
Prince Edward Island	-	-	-	-	-	-	-	1	-	1	-
Newfoundland	-	-	1	1	-	1	1	1	1	2	1
Eastern Region Sub Total	1	2	3	5	2	6	4	5	2	9	7
North West Territories	-	1	-	-	-	-	-	-	-	-	-
Other Countries (incl. U.S.A.)[2]	6	4	2	-	-	-	-	-	-	-	-
Total Enrolment	65	63	58	60	60	60	58	60	60	60	60
Male	62	55	50	48	48	46	44	43	41	35	41
Female	3	8	8	12	12	14	16	17	19	25	19

Notes: 1. Source: School of Optometry - University of Waterloo

2. From 1973 - 1980 - Enrolment restricted to Canadian Citizens and Landed Immigrant

2.0 Training Programs For Optometry

2.1 Western Canada - Province

2.1.1 British Columbia

No formal training programs provided in the province.

2.1.2 Alberta

No formal training programs provided in the province.

2.1.3 Saskatchewan

No formal training programs provided in the province.

2.1.4 Manitoba

No formal training programs provided in the province.

2.2 Western Canada - Region

No formal training programs provided in the Western Canada Region.

2.3.1 School of Optometry, Faculty of Science, University of Waterloo

The School of Optometry was incorporated into the University of Waterloo in 1967. Exhibit 1, opposite shows the enrolment by province for the years 1970-1980. The four year program is designed to graduate approximately 60 students per year, with a degree of Doctor of Optometry (D.O.). The entrance requirements are for one year of university courses, although candidates often have at least two complete years of undergraduate study.

Exhibit 2 - School of Optometry - University of Waterloo - Number of Applicants 1970-1980

Province	1978 Applicants	1978 Accepted	1978 Ratio	1979 Applicants	1979 Accepted	1979 Ratio	1980 Applicants	1980 Accepted	1980 Ratio
Western Canada Region									
British Columbia	17	3	5.67	22	3	7.33	14	5	2.8
Alberta	23	7	3.29	28	8	3.5	25	5	5
Saskatchewan	18	6	3.0	17	3	5.6	7	2	3.5
Manitoba	6	1	6.0	13	2	6.5	7	3	2.3
Western Region Sub-Total	64	17	3.75	80	16	5.0	53	15	3.5
Ontario	199	40	4.98	177	35	5.05	113	34	3.3
Total	344	60	5.73	328	60	5.46	238	60	3.96

Note: Number of applicants in 1980 reduced due to change in pre-professional requirements.

	Total Applicants	Total Accepted	Ratio: Applicant to Accepted
1970	125	65	1.9 :1
1971	185	63	2.94 :1
1972	280	58	4.83 :1
1973	396	60	6.6 :1
1974	391	60	6.52 :1
1975	365	60	6.08 :1
1976	324	58	5.58 :1
1977	361	60	6.02 :1
1978	350	60	5.83 :1
1979	328	60	5.46 :1
1980	232	60	3.87 :1

Exhibit 1 also shows the changing composition of student enrolment, including the ratio of male and female students.

The annual enrolment quota is stabilized at 60 students per year. The Dean of the school considers that under current funding arrangements, and with the current physical facilities, the school is at optimum capacity. The current clinic arrangements also preclude any major expansion in the immediate catchment area. If the program were to expand, additional clinic arrangements would have to be located in either Toronto, London or Windsor. This would result in further administrative costs.

Currently, formal training agreements exist between the Governments of Alberta, Saskatchewan and Manitoba and the Goverment of Ontario for positions in the program. The Government of Alberta can place up to a maximum of 7 students per year. The Governments of Saskatchewan and Manitoba can place up to a maximum of 3 students per year. Candidates for placement in the program must complete on an equal basis with all other applicants.

Exhibit 2, opposite, shows the number of applicants from Western Canada region for 1978 - 1980, and the total number of applicants for 1970 - 1980.

Traditionally, 95% of enrolments have graduated on completion of the program, and it is anticipated that this trend will continue in the future. Therefore, it is anticipated that output for the years 1981 - 1985 will be 58 graduates per year.

2.3.2 School of Optometry, University of Montreal

The School of Optometry affiliated with the University of Montreal in 1925. The language of instruction is French only, and all candidates for admission must complete an oral and written examination of competency in the French language.

The school has an annual intake quota of 40 students per year, which is considered ideal to service the requirements of the province. In the 1980 intake, approximately 60% of the class are females. There are approximately 550 applicants per year, or a ratio of 1 successful applicant to 13.75 applicants.

Attrition in training is minimal and outputs are anticipated to be 40 per year for 1981 - 1985.

Under an interprovincial training agreement, New Brunswick places 2 candidates in the school each year.

3.0 Training Programs For Chiropractic

3.1 Western Canada - Province

3.1.1 British Columbia

No formal training programs provided in the province.

3.1.2 Alberta

No formal training programs provided in the province.

3.1.3 Saskatchewan

No formal training programs provided in the province.

3.1.4 Manitoba

No formal training programs provided in the province.

3.2 Western Canada - Region

No formal training programs provided in the Western Canada Region.

3.3 Other Provinces

There is one School of Chiropractic in Canada, The Canadian Memorial Chiropractic College, located in Toronto, Ontario. The college is supported directly by tuition and subscriptions from the provincial Chiropractic Associations. The college receives no direct government funding. At present, the Board of Governors are actually pursuing potential affiliation with an Ontario based university. The basic hope is that

Exhibit 1 - Canadian Memorial Chiropractic College

Geographic Origin of Output - 1979		
British Columbia	-	11
Alberta	-	12
Saskatchewan	-	2
Manitoba	-	6
Ontario	-	86
Quebec	-	7
Maritimes	-	2
Outside Canada	-	4
Total	-	130

the college will be intergrated into a university program with an equal status to the School of Optometry at the University of Waterloo.

The basic program is a 4 year degree, leading to the qualification of Doctor of Chiropractic (D.C.). Enrolment quotas of 150 students have been established for the period 1981 - 1985. Approximately 10% of the enrolling students are female. Based on historical trends, 85% of the students graduate from the program, and of the graduating class, 75% are subsequently licensed to practice in Ontario. Exhibit 1, opposite, illustrates the geographic origins of the 1979 graduates.

There are no immediate plans to expand the college, and the enrolment quota of 150 students is considered to be an optimum level.

4.0 Training Programs For Podiatry/Chiropody

4.1 Western Canada - Province

4.1.1 British Columbia

No formal training programs provided in the province.

4.1.2 Alberta

No formal training programs provided in the province.

4.1.3 Saskatchewan

No formal training programs provided in the province.

4.1.4 Manitoba

No formal training programs provided in the province.

4.2 Western Canada - Region

No formal training programs provided in the Western Canada Region.

4.3 Other Provinces

There are no training programs for foot care personnel in Canada. The George Brown College of Applied Arts and Technology, and the Toronto Institute of Medical Technology in Ontario, are jointly developing a program to train chiropodists, consistent with the Government of Ontario's planned approach to foot care. The program is scheduled to begin in 1981, and the initial enrolment is anticipated to be 40 to 50. The program content is currently under development, and will likely be three years duration including one year of supervised clinical experience.

5.0 Training Programs For Ophthalmic Dispensing

5.1 Western Canada - Province

5.1.1 British Columbia

No formal training programs provided in the province.

5.1.2 Alberta

No formal training programs provided in the province.

5.1.3 Saskatchewan

No formal training programs provided in the province.

5.1.4 Manitoba

No formal training programs provided in the province.

5.2 Western Canada - Region

The four provincial associations currently use the correspondence course developed by the Canadian Guild of Ophthalmic Dispensers. This program is supplemented by seminars developed by provincial associations. The correspondence course has a high rate of student attrition (approximately 50%).

5.3 Other Provinces In Canada

There are currently two programs for Ophthalmic Dispensing in Ontario. These programs are at the Community College level, and are located at Seneca College, Toronto and Georgian College, Barrie.

The Seneca College program (previously located at Ryerson Polytechnical Institute, Toronto) is a three year night study course, leading to a certificate in Ophthalmic Dispensing. The anticipated training output is 45 students per year for the period 1980 - 1985.

The Georgian College program is a two year full time day course, leading to a Diploma in Optical Dispensing. The anticipated training enrolment is 50 students per year for the period 1980 - 1985.

6.0 Training Programs For Certified Prosthetists and Orthotists

6.1 Western Canada - Province

6.1.1 British Columbia

British Columbia Institute of Technology

The recently instituted program in prosthetics and orthotics currently consists of a two year course of study at the technician level. It combines lecture with practical bench experience through a series of clinical placements in the Vancouver area. The current enrolment plans are for 10 people to enroll every second year. Currently, British Columbia will place five people in the program, Alberta will place two people, and Saskatchewan will place three.

6.1.2 Alberta

No formal training programs provided in the province.

6.1.3 Saskatchewan

No formal training programs provided in the province.

6.1.4 Manitoba

No formal training programs provided in the province.

6.2 Western Canada Region

The Technician program at the British Columbia Institute of Technology represents the only training program in prosthetics and orthotics in Western Canada.

6.3 Other Provinces In Canada

There is one program for certified prosthetists and orthotists located at George Brown College, West Park Hospital in Toronto, Ontario. The course is of two years duration, plus a 1 year internship. The planned graduation is for 7 students per year. This program is to be transferred to the West Park Hospital and will use the facilities of the Chedoke McMaster Medical Centre and the Cripped Children's Centre in Toronto. The program capacity will be expanded to 12 students in 1983, and to 16 in 1985.

6.4 Certification As A Prosthetist/Orthotist

The registration and certification of the orthotic/prosthetic practitioner is controlled by the Canadian Board for Certification of Prosthetists and Orthotists (C.B.C.P.O.).

In order to be eligible for acceptance to write examinations for certification as an orthotist or prosthetist, candidates must:

- have completed two years of technical training in a School of Prosthetics or Orthotics, plus three years of practical experience in the field.

- or have completed five years of practical experience.

These requirements will change in the next five years, as the existing training programs and structures are formalized. By 1985, candidates will be required to complete a C.B.C.P.O. approved clinical prosthetic and/or orthotic program of at least two years duration, plus 24 months of practical experience.

6.5 Prosthetist/Orthotist Technician Training

There are currently two additional programs for technician training in Canada. These programs are located in Quebec, and Ontario.

Ontario

George Brown College in Toronto, offers a two year course, for prosthetic/orthotic technicians. The program graduates 15 students per year.

Quebec

The School of Prosthetics and Orthotics of Quebec Inc. is located in Montreal and affiliated with the Universities of Montreal and McGill. The Quebec government is currently evaluating the program with the intention of incorporating it within the community college system. The present program offers a two year diploma program in prosthetics, a two year diploma program in orthotics, and a three year combined diploma program in orthotics and prosthetics.

Province of British Columbia

Province of Alberta

Province of Saskatchewan

Province of Manitoba

WESTERN CANADA
HEALTH MANPOWER TRAINING STUDY

Section III - Category # 1 Report I

OPTOMETRY

REPORT I

OPTOMETRY: THE REQUIREMENT FOR ALTERNATIVE TRAINING AND FUNDING ARRANGEMENTS IN WESTERN CANADA

JANUARY, 1981

REPORT I

OPTOMETRY
THE REQUIREMENT FOR ALTERNATIVE TRAINING AND FUNDING ARRANGEMENTS IN WESTERN CANADA

TABLE OF CONTENTS

STUDY BACKGROUND, OBJECTIVES AND APPROACH — PAGE

Study Background - General Introduction I
Study Origins I
Study Objective II
Study Timing II
Study Approach III

1. SUMMARY AND RECOMMENDATIONS

Introduction 1
Western Canada Overview 1
Manpower Training Recommendations 6

2. DISCUSSION OF OCCUPATION

Definition of Occupation 8
Role 8

TABLE OF CONTENTS (Continued) PAGE

3. NET MANPOWER REQUIREMENTS

GENERAL ASSUMPTIONS

. Manpower Stock 17
. Factors Affecting Manpower Supply 17
. Requirements 20
. Productivity 22
. Sensitivity Analysis 25

PROVINCIAL ASSUMPTIONS

. BRITISH COLUMBIA

. Legal Controls 30
. Insured Services 30
. Assumptions 31
. Stock 31
. Factors Affecting Manpower Supply 31
. Requirements 34
Net Requirements 35

. ALBERTA

. Legal Controls 37
. Insured Services 37
. Assumptions 38
. Stock 38
. Factors Affecting Manpower Supply 38
. Requirements 41
Net Requirements 43

TABLE OF CONTENTS (Continued) PAGE

PROVINCIAL ASSUMPTIONS (Continued)

. SASKATCHEWAN

- Legal Controls 45
- Insured Services 45
- Assumptions 45
  - Stock 45
  - Factors Affecting Manpower Supply 47
  - Requirements 49

Net Requirements 50

. MANITOBA

- Legal Controls 53
- Insured Services 53
- Assumptions 54
  - Stock 54
  - Factors Affecting Manpower Supply 55
  - Requirements 57

Net Requirements 58

4. TRAINING RECOMMENDATIONS 61

Appendix A - Scope And Control of Practice

Appendix B - Occupation Bibliography

STUDY BACKGROUND, OBJECTIVES AND APPROACH

STUDY BACKGROUND - GENERAL INTRODUCTION

The provision of effective health services to the community is, to a considerable degree, dependent on three essential resources:

- an adequate supply of well trained specialist staff in each health occupation group
- the development of adequate facilities to service the community
- the availability of adequate funds to ensure cost effective and efficient health services.

The range and complexity of health treatment programs has expanded greatly in Canada during the last twenty five years. In addition, changing technology and the development of new treatment programs have resulted in an increased requirement for skilled, adequately trained health manpower. These factors have resulted in an increased emphasis on manpower planning and skill training for health occupations to ensure an adequate supply of trained practitioners to meet defined manpower requirements.

STUDY ORIGINS

The Western Canada Health Manpower Training Study was initiated by the Western Premiers at their annual conference in 1980. The study is under the direction of a Steering Committee comprised of government representatives from the Provinces of British Columbia, Alberta, Saskatchewan and Manitoba. The members of the Steering Committee represent both the Health and Education departments within each provincial government.

STUDY OBJECTIVES

The study terms of reference contain two major objectives. These are:

- to assess the existing and future needs for health manpower training programs and facilities in Western Canada

- to make recommendations for the rationalization of the location and funding of health manpower training programs and facilities in Western Canada.

STUDY TIMING

The study consists of a review of 26 health occupations to be examined in five categories. The initial category consists of five occupations, selected for the study on the basis of current availability of training programs in Western Canada. Although the study is divided into five categories for review, each occupation within these is to be studied independently over the next two years. Several of the occupations are inter-related. The requirement for one kind of manpower may be influenced by that of another, yet the two occupations may not be reviewed at the same time. Therefore, the study recommendations should be reviewed once all the occupations have been studied.

STUDY APPROACH

Introduction

In order to achieve the study objectives, the work program consists of three key activities. These are:

- the analysis of manpower supply and requirements, and the calculation of net manpower requirements
- the analysis of existing training programs for Western Canada
- the development of recommendations for alternative training locations and funding arrangements

Analysis of Manpower Supply and Requirements

The analysis of manpower supply and requirements is designed to allow for a variety of data inputs, and for different emphasis depending on the occupation under review. A variety of data sources are used including provincial and national associations, health insurance agencies, and provincial health and education departments. In all instances, data is developed independently of previously published sources.

In addition to the basic projection of net manpower requirements, a number of sensitivity analyses have been completed to assess the impact of changes in the factors affecting supply and requirements, prior to developing recommendations for either additional training programs, or expanding existing training programs.

Approaches to Determining Manpower Requirements

The approach developed to determine manpower requirements uses three methods of projection. These are discussed below.

1. Service Utilization Approach

The utilization approach is based on an analysis of the pattern of health service usage. It establishes trends in service utilization and projects these onto future population estimates. There are three steps in the service utilization approach.

Step 1 - Determine Per Capita Utilization Rate

Historical data of the number of services provided, by age and sex of recipient is derived. The number of services per age/sex group is then divided by the population for that group in the corresponding year. This results in a per capita utilization rate.

Step 2 - Project Future Service Required

The per capita utilization rate is projected onto the low, medium and high population for each year from 1981 to 2000. This results in an estimate of total future services.

Step 3 - Estimated Number of Practitioners Required

Having determined the total future services, the model projects the number of practitioners required, by assuming a constant level of services per practitioner. The number of services per

practitioner is determined by dividing total services by the number of practitioners in the base year. To estimate the required number of practitioners, the model divides total future services required by the number of services per practitioner.

2. Service Target Ratio Approach

Service target ratios reflect a theoretical optimal manpower level required to meet health service requirements in the occupation under review. They are expressed as the ratio of practitioner to population. The service target ratios are derived based on discussion with health authorities, review of published reports, articles and summary of defined health care needs.

3. Population Ratio Approach

Population ratios are derived by dividing the total population at a specified point in time by the number of active practitioners. This results in a ratio of practitioners to population.

These ratios are analysed to determine if any trends exists. To project future manpower requirements, the model divides total projected population by the previously determined population ratio.

EXAMPLE 1

TABLE

NET REQUIREMENTS

(Incremental and Cumulative)

YEAR	Low Population Scenario						Medium Population Scenario						High Population Scenario					
	LOW		MEDIUM		HIGH		LOW		MEDIUM		HIGH		LOW		MEDIUM		HIGH	
	B	B	A	A	C	C	B	B	A	A	C	C	B	B	A	A	C	C
1981	1	1	1	1	6	6	1	1	1	1	7	7	4	4	4	4	10	10
1982	-1	0	-1	0	-1	5	-1	0	-1	0	-1	6	-1	3	0	4	0	10
1983	-2	-2	-2	-2	-2	3	-1	-1	-1	-1	-1	5	-1	2	-2	2	-1	9
1984	-3	-5	-4	-6	-3	0	-3	-4	-3	-4	-3	2	-2	0	-2	0	-2	7
1985	8	3	8	2	8	8	9	5	8	4	9	11	9	9	9	9	9	16
1990	0	3	0	2	0	8	2	7	3	7	3	14	6	15	7	16	7	23
1995	-12	-9	-12	-10	-12	-4	-8	-1	-9	-2	-9	5	-4	11	-5	11	-4	19
2000	-10	-19	-11	-21	-10	-14	-6	-7	-7	-9	-7	-2	-2	9	-2	9	-2	17

Requirements derived using:

A. Historical ratio approach of 1:10,621 achieved in 1976
B. Utilization approach using curent services. No productivity
C. Service target ratio approach of 1:10,000

Summary of Approaches to Projecting Manpower Requirements

The three approaches outlined above have been used for the calculation of manpower requirements for this occupation. The specific application of each approach to this occupation is discussed under Requirements (Section 3.1.3 below).

Presentation of Provincial Net Manpower Requirements

At the conclusion of each provincial section of this report, Section (d) summarizes net manpower requirements, and shows both the incremental and cumulative requirement for each approach within three population scenarios. Example 1, opposite, shows a typical net requirement table.

The table is divided into three sections, low, medium, and high population scenarios. Within each section, low, medium, and high manpower requirement estimates are shown. The manpower requirement approach used to derive these is identified by a letter (A,B,C), which refers to the footnotes. Within each approach, two set of figures are shown for each time point. The left hand column shows the incremental net requirement, and the right hand column shows the cumulative net requirement.

Analysis of Existing Training Programs in Western Canada

This initial study category is composed of occupations for which there are currently no training programs in Western Canada. As part of this initial study we have, however, developed a basic approach for analysing existing training programs for subsequent occupation categories.

Development of Recommendations for Alternative Training Locations and Funding Arrangements

We have developed a decision process to assist in developing recommendations for alternative training location(s) and funding arrangements. This process is designed to allow for the logical, consistent evaluation of a range of training alternatives.

There are seven steps in the decision process:

- Step 1. Analysis of manpower requirements
- Step 2. Identification of the appropriate type(s) of training
- Step 3. Definition of alternative training locations
- Step 4. Evaluation of alternative locations for new programs
- Step 5. Establishment of timing of training program requirement
- Step 6. Recommendation on training action(s) and location(s)
- Step 7. Recommendation on funding alternative(s)

Recommendations for future training location and funding arrangements specific to this occupation are discussed in Section 4, below.

EXHIBIT 1 Western Canada Region - Manpower Requirements, Optometry
By Alternative - Uninterrupted Training

(MEDIUM POPULATION PROJECTION)

ALTERNATIVE	YEAR	1981	1982	1983	1984	1985	1990	1995	2000
	Stock	514	513	517	523	516	548	617	702
1.0	Requirement	530	543	558	569	581	639	693	744
CURRENT POPULATION RATIO	Net	16	30	41	46	65	91	76	42
	Incremental	16	14	11	5	19	26	-15	-34
2.0	Requirement	686	703	719	735	751	823	890	952
TARGET RATIO	Net	172	190	202	212	235	275	273	250
1:10,000	Incremental	172	18	12	10	23	40	-2	-23
3.0									
SERVICE DEMAND									
2% Increase in	Requirement	547	562	575	585	600	665	730	792
Demand Compound									
	Net	33	49	58	62	84	117	113	90
2% Increase in	Incremental	33	16	9	4	22	33	-4	-23
Productivity Compound									
4.0									
SERVICE DEMAND									
3% Increase in	Requirement	557	576	596	612	634	739	852	971
Demand Compound									
	Net	43	63	79	89	118	200	235	269
2% Increase in	Incremental	43	20	16	10	29	82	89	79
Productivity Compound									
5.0									
SERVICE DEMAND									
2% Increase in Demand	Requirement	547	565	583	601	621	717	821	928
Compound									
	Net	33	52	66	78	105	169	204	226
1% Increase in Productivity	Incremental	33	19	14	12	27	64	35	22
Compound									
6.0									
SERVICE DEMAND									
3% Increase in Demand	Requirement	557	578	605	628	657	798	956	1139
Compound									
	Net	43	65	88	105	141	250	339	437
1% Increase in Productivity	Incremental	43	22	23	17	36	109	89	98
Compound									

EXHIBIT 2 Western Canada Region - Manpower Requirements, Optometry
By Alternative - Interrupted Training

(MEDIUM POPULATION PROJECTION)

ALTERNATIVE	YEAR	1981	1982	1983	1984	1985	1990	1995	2000
	Stock	514	513	517	523	516	539	563	603
1.0	Requirement	530	543	558	569	581	639	693	744
CURRENT POPULATION RATIO	Net	16	30	41	46	65	103	130	141
	Incremental	16	14	11	5	19	38	27	11
2.0	Requirement	686	703	719	735	751	823	890	952
TARGET RATIO	Net	172	190	202	212	235	284	327	349
1:10,000	Incremental	172	18	12	10	23	49	43	22
3.0									
SERVICE DEMAND									
2% Increase in	Requirement	547	562	575	585	600	665	730	792
Demand Compound									
	Net	33	49	58	62	84	126	167	189
2% Increase in	Incremental	33	16	9	4	22	42	41	22
Productivity Compound									
4.0									
SERVICE DEMAND									
3% Increase in	Requirement	557	576	596	612	634	739	852	971
Demand Compound									
	Net	43	63	79	89	118	200	289	368
2% Increase in	Incremental	43	20	16	10	29	32	89	79
Productivity Compound									
5.0									
SERVICE DEMAND									
2% Increase in Demand	Requirement	547	565	583	601	621	717	821	928
Compound									
	Net	33	52	66	78	105	178	258	325
1% Increase in Productivity	Incremental	33	19	14	12	27	73	80	67
Compound									
6.0									
SERVICE DEMAND									
3% Increase in Demand	Requirement	557	578	605	628	657	798	956	1139
Compound									
	Net	43	65	88	105	141	259	393	536
1% Increase in Productivity	Incremental	43	22	23	17	26	118	134	143
Compound									

1.0 GENERAL INTRODUCTION

1.1 Introduction

This report addresses the projected net manpower requirements for optometrists in the Provinces of British Columbia, Alberta, Saskatchewan, and Manitoba for the period 1981 to 2000.

The study process begins with an assessment of the current stock of optometrists in each province, and of the factors likely to influence this stock in the future. The current and future demand for optometric services is next examined. The net requirement for optometric manpower over the projection period is obtained from a comparison of projected manpower supply and requirements.

For each province and the Western Region, the projected future net manpower requirements for optometry are subjected to a sensitivity analysis in order to determine the importance of underlying assumptions to the net result. The last step of the study process is to determine the requirement for alternative location(s) and funding arrangement(s) for the training of optometrists in Western Canada. The recommendations concerning training are summarized below.

1.2 WESTERN CANADA OVERVIEW

Exhibit 1 and 2, opposite, show the manpower requirements for optometry for Western Canada. The requirements have been derived using the medium population projection, and represent

four alternative scenarios. These are net manpower requirements based on:

1. the current population ratio

2. the target ratio of 1 practitioner for 10,000 population

3. an estimated 2% annual increase in the demand for services (compounded over the twenty year forecast period) and a 2% annual increase in practitioner productivity (compounded over the twenty year forecast period). This projection was considered to be the most likely and forms the basis for the recommendations presented.

4. an estimated 3% annual increase in the demand for services (compounded over the twenty year forecast period) and a 2% annual increase in practitioner productivity (compounded over the twenty year forecast period).

5. an estimated 2% annual increase in the demand for services, (compounded over the twenty year forecast period), and a 1% annual increase in practitioner productivity (compounded over the twenty year forecast period).

6. an estimated 3% annual increase in the demand for services (compounded over the twenty year forecast period), and a 1% annual increase in practitioner productivity (compounded over the twenty year forecast period).

In each of the above, net manpower requirements were derived for each province, and these have been combined to determine the net requirements for Western Canada.

Exhibit 1 shows the net manpower requirements assuming that the 13 contracted training places between the Provinces of Alberta, Saskatchewan and Manitoba, and the Province of Ontario and the School of Optometry, University of Waterloo, are maintained beyond the anticipated student intake in 1984.

Exhibit 2 shows the net manpower requirements assuming that the contracted training places are terminated at the end of the contract period. This has the net effect of decreasing stock in the year 2000 by 99 practitioners.

Highlights

There is an immediate need for additional optometrists to offset the high rate of retirement in Western Canada in the next 10 years. Currently, 170 practising optometrists (or 33% of the total active stock of optometrists in Western Canada) are aged 55 or over and will retire in the next ten years. The most significant manpower need is in the Province of Alberta. Under the most likely scenario, and assuming continued training output from the School of Optometry, University of Waterloo, there is the potential for a limited surplus of optometrists in Western Canada after 1990.

Role and Scope of Practice Issues

The provision of vision care services is currently dependent on the inter-relationship of medical personnel like general practitioners, medical specialists and ophthalmologist,

optometrists and ophthalmic dispensers. Although the role and scope of practice has been defined by legislation, there is at present a need to clarify the exact role and scope of practice for each profession.

Within the study terms of reference, we were required to project the requirement for optometric manpower. Using the various approaches to project manpower requirements, we have determined a range of net requirements. These have been based on certain assumptions on the inter-relationship between occupations.

For example, the service target ratio of 1 optometrists to 10,000 population is based on an assumption that there are 3 optometrists for every ophthalmologist. At this time, however, we have not projected the supply and requirement for ophthalmologists. This analysis of ophthalmologists will be undertaken as part of the final study category of occupations dealing with medical practitioners and specialists.

In the approach to this study, we have used a number of innovative approaches to project net manpower requirements. Where appropriate, we have suggested alternative manpower approaches to health care delivery. The study terms of reference are specific and require that we determine the potential alternative training location and funding arrangements for each occupation. The study is not intended, however, to address basic issues related to occupational role and scope of practice. Thus, in the case of optometry, we have not addressed alternative methods or approaches to vision care, but restricted the study to a review of the legislated role.

Any discussion or decision on the future education of optometrists, including the establishment of a school of optometry should be postponed until completion of the study on ophthalmologists.

Summary of Net Manpower Requirements

1980's

In summary, there is an immeidate requirement for additional optometric manpower due to the large number of optometrists retiring in the 1980's. In fact, the additional requirement of 11 to 12 optometrists on average per year plus the 13 places which are reserved at the University of Waterloo each year for qualified applicants from Alberta, Saskatchewan and Manitoba would have justified a School of Optometry in Western Canada being set up in the mid-1970's with an annual intake of 25 to 30 students. However, due to the lead time in establishing a school and the lengthy training program, the net requirement for optometrists in Western Canada in the 1980's will have to be met in other ways.

1990's

There are a number of sensitive issues which influence the long term projections for manpower requirements for optometry in the 1990's. These are:

- the role and scope of practice of optometry, and the inter-relationship with ophthalmologists

- the potential for increased services resulting from additional insured services, and the current trend from vision care benefits

- the impact of the growing number of female practitioners

- the potential to increase productivity for individual optometrists

1.3 MANPOWER TRAINING RECOMMENDATIONS

- That any decision on the establishment of a school for optometry in Western Canada be deferred until the completion of the study of ophthalmologists in Category 5.

- That the Western Provinces actively recruit optometrists from outside Western Canada during the 1980's.

- That Alberta, where the major manpower need is greatest, increase the number of contracted training programs in the optometry program at the University of Waterloo by two (2) places per year, or if these places are not available, establish a bursary program for two (2) individuals to study in a school of optometry in the United States, for a period of five years.

2. DISCUSSION OF THE OCCUPATION - OPTOMETRY

2.1 DEFINITION OF OPTOMETRISTS

An optometrist is defined as a person qualified to:

"Examine patient's eyes to determine visual efficiency and prescribe treatment (excluding surgery) to conserve, improve and correct vision. Locate and measure defects in vision, using ophthalmoscopes, biomicroscopes and other instruments. Refer patients to medical practitioner if signs of occular disease are detected. Prescribe eyeglasses, contact lenses, eye exercises and other treatments that do not require surgery. Test finished lenses for conformity with prescription. Teach patients the use and care of contact lenses. Counsel patients regarding visual hygiene, lighting arrangements, working distances and safety factors. Assist patients with selection of frames and adjust frames to ensure comfortable fit."[1]

2.2 ROLE

2.2.1 Historical Evolution

Spectacles were first used for the correction of visual defects in the 13th century. They were prefabricated and sold in 20 powers by artisans, the ancestors of the optometrist and optician. Advances in optical science in the 18th century resulted in the introduction of bi-focal and cylindrical lenses, which correct for near- and far-sightedness and astigmatism, respectively. The large, number of lens combinations made possible by technological advances, and by public demand for separate lenses to correct visual dysfunction in each eye, created a need for made-to-order spectacles. In response to this

1. Canadian Classification and Dictionary of Occupations, 1971.

need, spectacle makers started conducting visual examinations in addition to lens fabrication and dispensing. By the 19th century, some artisans had specialized in fabrication and dispensing, while others concentrated on visual examinations. The latter group were called optometrists. During the 20th century, optometry has established itself as a profession with a university based training program, its own act regulating practice and the setting of ethical standards by optometric associations.

2.2.2 Functions

Optometrists are primary contact practitioners who care for the healthy, but inadequate visual system. They conduct optometric eye examinations to determine the presence of visual problems, eye disease or other abnormalities and prescribe corrective lenses, preventative devices, or visual training to preserve or restore maximum efficiency of vision. Most optometrists dispense eye wear since the supervision of treatment is considered to be essential in assessing the effectiveness of the diagnosis. Dispensing includes the supplying, fitting, and adjusting of spectacles and contact lenses, as well as the giving of instructions on their use. In recent years, the scope of practice of optometrists has expanded to include the education and counselling of eye care in industry and the community. Optometrists do not prescribe drugs, make definitive diagnoses, treat eye disease or perform surgery.

2.2.3 Contribution To Continuum Of Health Care Delivery

Vision care services are primarily provided by optometrists, ophthalmologists, and ophthalmic dispensers. Both optometrists and ophthalmologists are independent primary practitioners treating the healthy eye to increase

its functional efficiency. Ophthalmologists also deal with eye disease, perform surgery, and act as a resource to other primary practitioners. Both optometrists and ophthalmic dispensers supply , fit and adjust eye wear. Optometrists provide dispensing services as a complement to visual examinations and diagnosis, whereas ophthalmic dispensers provide a single service. As optometry operates outside and independently of the medical system, the role of the optometrist vis a vis other health professions is not clearly defined.

2.2.4. Relationship With Other Occupations

Optometric services overlap with ophthalmogical and ophthalmic dispensing services, hence, conflicts have developed over professional jurisdiction.

Ophthalmologists

Ophthalmologists and optometrists have different views respecting the role of optometrists in vision care. Ophthalmologists consider themselves to be the only totally qualified group of vision and eye care professionals. They feel that optometrists are over-trained for refracting, prescribing and dispensing but undertrained in eye pathology and pharmacology for diagnosing and treating eye disease. Consequently, they have resisted the expansion of optometric practice and have suggested that technical assistants under the direction of ophthalmologists could conduct routine eye examinations.

Optometrists have a different view of the optometrist-ophthalmology controversy. Because of their training and function, optometrists consider themselves to be primary vision care practitioners, with the medical referral

system restricting the growth of their profession. They argue that it is not cost effective for ophthalmologists trained to perform at a higher level than primary care, to perform routine visual examinations. As well, optometrists point out that ophthalmologists have little formal training in optics or fitting contact lenses. They are also concerned about the potential delegation of tasks by ophthalmologists to potentially unqualified persons.

A number of studies have been made regarding the role of the optometrist vis a vis the ophthalmologist. The study of Vision Service Delivery in Ontario[2] suggested that optometry be considered as a primary vision care resource with responsibility for contact lens prescriptions. Ophthalmologists would mainly treat eye disease and conduct surgery. While the British Columbia Vision Care Task Force[3] did not make specific recommendations regarding the role of the optometrist vis a vis the ophthalmologist, it suggested direct and reciprocal referrals between optometrists, ophthalmologists and general practitioners to rationalize the vision care system. Another recommendation was the development of rural vision care models with the participation of ophthalmologists, optometrists and opticians.

2. Woodruff, M.E. and B. Schmidt, A Study of Vision Service Delivery in Ontario with Recommendations for Meeting the Unmet Needs for Vision Care and Rationalization of the Delivery of Vision Care Services, 1977.
3. Report of the Vision Care Task Force, Ministry of Health, British Columbia, 1977.

Other studies have made recommendations for the purpose of encouraging professional dialogue between their respective associations. The Task Force on Eye Care in Nova Scotia[4] recommended setting up a continuing committee on eye care which would develop policy guidelines on the role of each profession, their relationship and the use of assistants. In the Vision Canada Report[5] on low vision clinics, a coordinating committee of optometrists, as well as ophthalmologists was recommended to develop an approach to meeting the unmet needs of the blind.

The United States has also experimented with several vision care models. In health maintenance organizations where a variety of health providers work together in a single facility as a team, optometrists evaluate all patients and refer to ophthalmologists as necessary. Group practices with an optometrist under the direction of ophthalmologists have also been set up.

Ophthalmic Dispensers

Because many optometrists often dispense optical appliances in their offices, conflict exists between ophthalmic dispensers and optometrists. Optometrists view dispensing as an essential ingredient in assessing the effectiveness of the diagnosis. They want control over the quality of ophthalmic materials prescribed and accuracy in the manner in which the prescription is fabricated. Because dispensing is considered an essential part of service and generates significant income, optometrists are concerned about ophthalmic industry advertisements encouraging patients to have their prescription filled outside the optometric office. Provincial legislation prohibits optometrists from advertising.

4. A Report of the Task Force on Eye Care, Nova Scotia Council of Health, 1972.
5. Vision Canada, Health and Welfare, 1977.

Optometrists also feel that opticians are undertrained to dispense contact lenses. As well, the use of optometric equipment in the dispensing of contact lenses by ophthalmic dispensers is viewed as an infringement on the scope of the optometric profession. The British Columbia Optometric Association specifically prohibits optometrists from sharing contact lens work with opticians.

Opticians argue that it is a conflict of interest for optometrists to dispense frames and merchandise in addition to prescribing. Furthermore, they feel it is not cost effective for optometrists who are trained to perform visual examinations to dispense lenses. Opticians are also concerned about the qualifications of optometric assistants, since these are not required to be registered.

Vision care studies have dealt with the relationship of ophthalmic dispensers to optometrists. The Study of Vision Care Delivery in Ontario suggested that optometrists remove themselves from dispensing wherever it is economical for an ophthalmic dispenser to set up an outlet. It was also recommended that contact lens services should be limited to optometrists and ophthalmologists, with the dispensing done by ophthalmic dispensers who are accountable to the prescriber.

The British Columbia Vision Care Task Force also made recommendations regarding the respective roles of optometrists and ophthalmic dispensers. Unlike the Ontario study, it did not recommend that optometrists discontinue dispensing, but it did suggest that they provide optical devices at cost, and that their services be charged on a fee for service basis. Providing the

establishment of an adequate Dispensing Opticians Act and a training program, the Task Force suggested that changes be made in the Optometry Act to permit the flow of optometric contact lens prescriptions to dispensing opticians, and to allow opticians to use any devices necessary to fit contact lenses.

2.2.5 Legislation

The practice of optometry is defined in and regulated through provincial legislation. Recent and proposed legislative changes have implications for the role of optometrists. While the use of drugs by optometrists is prohibited in most provinces, a recent amendment in New Brunswick allows the use of pharmaceutical agents in optometric visual assessments. The British Columbia Vision Care Task Force also recommended a change in the code of ethics governing the practice of optometry under the act, to ensure that patients with potential eye disease are referred.

2.2.6. Insurability Of Service

Government influences the role of optometrists through insurance coverage. Refractions were excluded from the early medical plans until the Medical Care Act was revised, to allow for federal-provincial cost sharing of vision services. All provinces presently insure optometric refractions except New Brunswick, Newfoundland, and Prince Edward Island. Not all optometric services are insured however. Generally, provinces insure refractions but not orthoptics, contact lens fitting, vision therapy, visual fields, or tonometry among others. As well, there is often a limit on the number of services covered in each benefit period.

The British Columbia Vision Care Task Force recommended a consultants' fee for ophthalmologists who attend patients referred by an optometrist to facilitate direct and reciprocal referrals.

2.2.7. Impact of Technology

Optometric technology such as the automatic refractor and its impact on the profession is described in the General Assumption section on productivity.

2.2.8 Education

Optometrists receive two years of basic science education followed by a four year professional program in physiological optics and optometry. The only English speaking optometric program in Canada is the School of Optometry at the University of Waterloo, while the French school is affiliated with the University of Montreal. The quota per year at the University of Waterloo is 60 students, excluding students in the post-graduate program. Alberta, Saskatchewan and Manitoba signed a training agreement in 1975 with Ontario to ensure places for residents in the optometric program. Alberta is guaranteed 7 places and Manitoba and Saskatchewan are alloted 3 each. British Columbia did not participate because the Ministry of Health felt the migration of recently qualified graduates was sufficient to meet their needs. The Optometric Associations have been lobbying for a Western School of Optometry. Both the University of Calgary and University of Victoria have given consideration to their proposal.

In the United States, a number of Schools of Optometry as well as community colleges have two year training programs for optometric assistants. They receive instruction in business office procedures, dispensing and fabrication, contact lenses, and assisting the optometrist in obtaining diagnostic findings. The Canadian Optometric Association and the School of Optometry at the University of Waterloo have had discussions with Conestoga College in Kitchener, Waterloo regarding the introduction of a 2 year optometric assistant program.

TABLE I.0.1

TOTAL NUMBER OF

OPTOMETRISTS IN WESTERN CANADA

YEAR	BRITISH COLUMBIA[1]	ALBERTA[2]	SASKATCHEWAN[3]	MANITOBA[4]
1970	146	129	74	53
1971	149	128	73	57
1972	147	129	73	57
1973	148	141	73	57
1974	161	158	77	57
1975	158	163	80	61
1976	164	167	81	64
1977	168	173	85	65
1978	164	173	92	63
1979	163	173	90	69
1980	175	184	89	68

Notes: 1. British Columbia Optometric Association.

2. Alberta Optometric Association.

3. Saskatchewan Medical Care Insurance Commission.

4. Manitoba Health Services Commission.

TABLE I.0.2

FACTORS AFFECTING MANPOWER SUPPLY

OPTOMETRISTS - WESTERN CANADA

FACTOR	BRITISH COLUMBIA	ALBERTA	SASKATCHEWAN	MANITOBA
Opening stock	175	184	89	68
Net migration	7 per year	1 per year	1.5 per year	1 per year
Net immigration	1 per year	1 per year	0 per year	1/3 per year
Net occupational shifts	0 per year	0 per year	0 per year	0 per year
Training output	0 per year	5 per year	2 per year	2 per year
Active/inactive flows	0 per year	0 per year	0 per year	0 per year
Attrition	1979 age distribution and retirement at 65 & survey of retirement intentions	Same	Same	Same

Notes: 1. The assumptions are based on data and interview input from the Optometric Associations and School of Optometry.

3. NET MANPOWER REQUIREMENTS

3.1 GENERAL ASSUMPTIONS

3.1.1 Manpower Stock 1970 to 1980

The total number of optometrists in Western Canada from 1970 to 1980 is displayed in Table I.0.1,opposite. Currently, there are about 516 optometrists in total in Western Canada. The sources of data for British Columbia, Alberta, Saskatchewan and Manitoba were from the Provincial Optometric Associations. The counts include registered optometrists who are active in their respective provinces. Alternative optometric manpower counts are identified, as well as the definitional differences among sources, in later sections on provincial parameters.

3.1.2 Factors Affecting Manpower Supply

Table I.0.2, opposite, shows the assumptions with respect to each of the factors which have the potential to affect stock, that is, migration, immigration, occupational shifts, training output, active to inactive movements, and attrition. A discussion of each of these factors follows.

- Net Migration

  Data specific to interprovincial migration of optometrists is not available. However, estimates of net migration have been derived from information

provided by the optometric associations and schools of optometry.

. Net Immigration

Based on interviews with the optometric associations, we estimate that 1 optometrist from a United States School of Optometry sets up practice in British Columbia and Alberta each year. Historically, Manitoba gains 1 net immigrant every 3 years. In recent years, no optometrists have immigrated to or emigrated from Saskatchewan. Future manpower stock is projected assuming the current level of net immigration.

. Net Occupational Shifts

The lengthy training program for optometry precludes the upgrading of a related occupational group over a short period of time. As well, the optometric associations indicated that very few optometrists leave the profession prior to retirement. For each of the western provinces, we have assigned a value of zero to this variable.

. Training Output

Alberta, Saskatchewan, and Manitoba have an agreement with Ontario to ensure places for qualified residents in the School of Optometry, University of Waterloo. Alberta is guaranteed 7 places and Saskatchewan and

Manitoba are alloted 3 each. Based on conversations with the optometric associations and the School of Optometry, we have assumed that 5 students out of 7 return to practice in Alberta, and 2 out of 3 return to both Saskatchewan and Manitoba over the forecast period. British Columbia has no contractual agreement, because the Ministry of Health felt that migration of recently qualified graduates was sufficient to meet their needs.

Active to Inactive

During the interviews with the provincial optometric associations, it was indicated that there are no inactive optometrists in Western Canada, although a number only work part-time. The distribution of full to part-time practitioners in Saskatchewan and Manitoba is based on those billing the insurance plans in excess of $10,000 per annum. No data is provided on the number of optometrists working full or part-time in British Columbia and Alberta.

The future stock of optometrists may be affected by the occupations' age-sex distribution, if the female labour force participation of optometrists is less than that of males. While females make up 60% of the total enrolment in the two Schools of Optometry in Canada, there are only 27 females or less than 5% of the total optometric manpower stock in Western Canada.

TABLE I.0.3

AGE STRUCTURE OF OPTOMETRISTS

BY PROVINCE AND REGION - 1979[1]

AGE GROUP	BRITISH COLUMBIA	ALBERTA	SASKATCHEWAN	MANITOBA	TOTAL	
					#	%
24 or less	1	8	-	2	11	2.4
25 - 29	14	25	4	6	49	10.7
30 - 34	19	36	16	9	80	17.5
35 - 39	11	24	9	6	50	11.0
40 - 44	11	10	5	1	27	5.9
45 - 49	7	10	7	2	26	5.7
50 - 54	15	13	8	7	43	9.4
55 - 59	21	25	16	15	77	16.9
60 & over	45	25	3	20	93	20.4
Unknown	19	8	15	1	43	
TOTAL	163	184	83	69	499	

Notes:

1. Data derived from the Provincial Optometric Associations.

As the associations report that historically, female optometrists have remained active during their child-bearing years, the value for active to inactive flows is assigned to zero over the forecast period.

- Attrition From Death and Retirement

We estimated attrition by using the 1980 age distribution and by automatically retiring individuals at age 65. In Western Canada there are 239 optometrists currently 45 years and older, who are expected to retire in the next 20 years. This represents about 52% of the current manpower stock. For Alberta and Saskatchewan, we also used the results of a membership survey of retirement intentions to estimate attrition. Attrition through death was not estimated separately due to the high joint probability of death and retirement and the small size of the occupational group. Table I.0.3, opposite, shows the age distribution of optometrists for Western Canada.

3.1.3 Requirements

- Historical Ratio

The current ratio for 1970 to 1980 of optometrists to population in each province were used to project the number of optometrists required to maintain the current level of services over time.

- Utilization

From each medical insurance plan, we obtained statistics on the age-sex distribution of optometric services or patients. Projections were made using the current utilization rate as well as a forecasted rate, if time trend data existed. Utilization data from each province shows a positive relationship between services per capita and age, and higher utilization rates for females than males in each age grouping.

- Service Target Ratio

Two service target ratios are commonly used for projecting optometric manpower requirements. The ratio of 1 optometrist to 10,000 population is recommended by both Health and Welfare Canada and the World Health Organization. This service target ratio is supported by the Canadian Optometric Association.

Another widely used optimum ratio is 1:7,000. This estimate of need developed for the United States by Elliot and Burchard[7] in 1967, was based on the incidence of visual defects, defined standards of care and the introduction of a national health care scheme. This ratio is recommended by the American Optometric Association. It is often used by the United States Bureau of Health Manpower, Department of Health Education and Welfare, in projecting the optometric

7. Burchard C. and T. Elliot "A Revaluation of the Ratio of Optometrists To Population In The United States In Light of Socio-Economic Trends in Health Care." American Journal of Optometry, 1967.

manpower required to provide comprehensive vision care services, including fulfilling unmet vision care needs. The unmet vision care needs are generally considered to include school screening, motor vehicle vision testing, vision consulting to industry and sports, regular examination of the native, disadvantaged, and institutionalized population, and low vision therapy to the blind and partially sighted.

3.1.4 Productivity

- Technology

The automatic refractor is expected to have a limited impact on the productivity of optometrists. The device replaces only one component of the optometric examination and the setting up, processing and reading of findings from electronic refraction instruments takes approximately the same time as a subjective retinascopic examination.[8] As well, the findings provide inaccurate diagnostic judgements for patients who cannot fixate such as small children, older persons with poor reflex, and those with subnormal vision[9]. Although the automatic refractor will not

8. Interview with optometric associations
9. Woodruff M.E. "A Comparison of Two Automated Refractors With Retinascope Findings In A School Screening Program, "Canadian Journal of Optometry, December, 1979.

substantially affect productivity, the widespread introduction of computerized record systems and the continued development of optometric technology will likely expand the service capabilities of optometrists in the future.

Delegation of Tasks

A number of studies have been conducted on the relationship between optometric productivity and the use of assistants. The United States National Study of Assisting Manpower in Optometry[10] estimated that the effective utilization of office assistants could increase optometric productivity by 50%, while the use of more technical auxillary personnel to assist in visual examination and treatments could result in a 100% increase. Coates[11], in his studies in the Economics of the Profession of Optometry, developed a production function for optometric output. His results indicated that optometrists underutilize aides. Potential productivity improvement with the delegation of tasks was estimated at 30%.

10. Haffner, A. A National Study of Assisting Manpower In Optometry, Optometric Center of N.Y., 1971
11. Coates, D. Studies In The Economics of The Profession of Optometry, Phd dissertation, The City University of New York.

Marg and Ng[12] conducted a productivity study for the United States Air Force. Their stop watch analyses showed that the use of assistants and advanced technology could reduce examination time to 10 minutes. However, no account was taken of patient-practitioner exchange in taking the case history or advising the patient on treatment.

The only data available in the use of auxillary optometric personnel in Western Canada, is the 1978 survey of General Practice Patterns and Workload Distribution of optometrists in British Columbia.[13] According to the survey, the use of assistants in optometric practices is widespread. Over 70% had at least one assistant/secretary, and of these almost 40% had 2 or more. As well, about 30% of the optometrists surveyed employed an optician.

- Productivity Scenarios

After considering potential productivity improvements through use of new technology and utilization of assistants, we developed several productivity scenarios. Manpower projections were made based on a constant productivity assumption, as well as on compound annual increases of 1% and 2%. Compound

12. Marg, E. and Ng, R. "Optometrists Human and Computer Assistants, "Journal of Occupational Medicine, May 1, 1972.
13. Schmidt, B.T. and M.J. Samet, Optometrists Core Group, The Canadian Journal of Optometry, June, 1980.

annual increases of 1% and 2% result in productivity improvements of 22% and 49% after 20 years. These productivity improvements are compatible with the results of the optometric productivity studies. In all instances, a maximum of 2,500 refractions per optometrist, per year was imposed as a limit on productivity.

3.1.5 Sensitivity Analysis

Factors Considered From Alternative Strategies and Solutions

A number of strategies and solutions pertaining to manpower mobility, productivity and occupational incentives may represent more appropriate responses to manpower imbalances than the alteration of training output. The theoretical basis for these alternative solutions is discussed in Report B, Section I. In the section which follows, we conduct a sensitivity analysis to determine how net manpower requirements for optometry are affected by changes in the assumed level of mobility, productivity and incentives.

A. Mobility

Under mobility, the factors of net migration, net immigration and occupational movements are considered. Each of these is directly influenced by the requirement for practitioners in other provinces, as well as the supply and

the requirement in Western Canada. The net migration and net immigration rates assumed in the projection of supply are based on information obtained from provincial optometric association records. We believe that this data has an acceptable level of accuracy.

In order to determine the potential for increasing net migration and immigration, we reviewed the projected requirement for manpower in two major markets, Ontario and the United States.

Ontario - In 1979, the supply and requirement for optometrists in the Province of Ontario was adequate. However, the projected future Ontario manpower in the period 1980 to 1990 reflects a pattern similar to Western Canada, with a large number of retirements anticipated in the period. In 1974, the mean age of full time Ontario practitioners was 47.7 and the median age was 50. About 9% of active practitioners were aged over 65 years. Given this age distribution, the attrition due to death and retirement will increase in the next ten years.[14] This will result in an increased requirement for optometrists in Ontario, but it is anticipated it will be adequately met by the output from the School of Optometry, University of Waterloo.

14. Health Manpower In Ontario, 1978, Health Manpower Planning Section Government of Ontario.

United States of America - Based on reported information, there is an apparent shortage of optometrists in the United States. Parallel to the situation in Canada, a high proportion of American practitioners will be retiring in the next 10 to 15 years. It is anticipated that by 1990 the supply and requirement for American optometrists should be more or less in balance. Currently, training programs in the United States of America are being expanded[15], in order to meet the identified requirement.

In summary, there is an immediate requirement for manpower in both Ontario and the United States to offset the anticipated level of retirement. We did not therefore consider it appropriate, to increase the estimate of net migration and net immigration for the projection period 1981 to 2000 in Western Canada.

The third factor considered under labour mobility is inter- and intra-occupational mobility. Because of the training period involved, and the requirement to establish private practice, there is limited potential for inter-occupational movement.

B. Productivity

The factors included under productivity include the impact of technology, the delegation of tasks, and mode of practice. Each of these factors specific to optometry are discussed in Section III above (See pages 22 - 25).

15. A Report to the President and Congress on the Status of Health Professions Personnel in the United States. U.S. Department of Health, Education and Welfare, 1978.

Projections were made based on a constant practitioner productivity assumption, and on compound annual productivity increases of 1% and 2% per annum.

C. Occupational Incentives

Optometrists usually operate in private practice. The pattern of individual earnings and employment practices was not considered as a relevant factor in optometric supply, therefore, we did not attempt any sensitivity analysis of this factor.

3.1.6 Result of the Sensitivity Analysis

The manpower requirements for optometry were subjected to the following sensitivity analysis.

. Productivity - Services per practitioner were calculated under a constant productivity assumption, and on compound annual productivity increases of 1% and 2%.

. Training Output - Two sets of projections were made. The first was made under the assumption of continued training output from the School of Optometry, at a constant level for the projection period 1981 to 2000. The second projection was made under the assumption of interrupted training output from 1989 to 2000. This assumption was adopted to assess the impact of not renewing the current training agreement. The impact of interrupted training would decrease stock by 99 practitioners by the year 2000.

TABLE I.0.4

PER CAPITA SERVICE USAGE, BY PROVINCE

OPTOMETRIC SERVICES, BY YEAR 1970 to 1979

YEAR/PROVINCE	BRITISH COLUMBIA	ALBERTA	SASKATCHEWAN	MANITOBA
1970	0.070	-	-	0.076
1971	0.070	-	-	0.085
1972	0.065	0.105	-	0.091
1973	0.067	0.111	0.119	0.0965
1974	0.071	0.120	0.122	0.101
1975	0.083	0.121	0.133	0.106
1976	0.095	0.122	0.142	0.109
1977	0.103	0.124	0.146	0.118
1978	0.103	0.116	0.151	0.126
1979	0.105	0.127	0.163	0.146

Sources: British Columbia: Medical Services Plan, Ministry of Health

Alberta: Alberta Health Care Insurance Plan

Saskatchewan: Saskatchewan Medical Care Insurance Commission

Manitoba: Manitoba Health Services Commission

. Age Structure/Retirement - For the provinces of Alberta and British Columbia, two manpower projections were undertaken to test the importance of the assumed retirement age. The first projection was made based on a survey of retirement conducted by the national association. The second projection was based on retirement at age 65. For the province of Manitoba, two projections were made. The first projection was based on retirement at age 65; the second projection was made based on retirement at age 60. The impact of changing the retirement assumption was to decrease the stock of optometrists in the years 1981 to 1985.

. Per Capita Demand For Services - Table I.0.4, opposite, shows the trend in per capita service usage by province, for optometric services. The increasing trend in per capita service usage is apparent from this table. Little analysis has been undertaken at the provincial level in terms of anticipated future demand for services, or the future pattern of service usage. In order to determine manpower requirements, projections of service demand were made based on:

- the current level of per capita service usage
- increased service usage based on 1%, 1.5%, 2%, 2.5% and 3% annual increase in per capita service usage, projected onto the medium population scenario.

The assumption of a 2% increase in per capita service usage was adopted, as representing the most reasonable increase in service utilization over the 20 year forecast period.

3.2. PROVINCIAL ASSUMPTIONS

3.2.1 BRITISH COLUMBIA

a) Legal Controls - The Optometry Act of British Columbia defines the practice of optometry as:

> "investigation of the functions of the human eye by test lenses, test cards, trial frames and other instruments or devices designed for that investigation and prescription or adaptation of lenses, prisms or the use of orthoptic instruments of any kind to improve or correct the visual function or to adopt the visual function to the requirements of a special occupation."

Only persons who hold a certificate of registration issued by the Board of Examiners established under the Act are authorized to practice optometry. To qualify as an optometrist, the applicant must be a British subject and 19 years of age, and must pass the examinations set by the Board.

b) Insured Services

The Medical Services Plan of British Columbia insures optometric eye examinations. These services include the determination of the refractive status of the eye, the presence of any observed abnormality in the visual system, all necessary tests connected with the examination and the provision of a written prescription if lenses are required. A major examination fee is paid for a complete visual analysis, while a minor examinstion fee applies for subsequent diagnostic examinations. Extra service fees are paid for tonometry and central field testing. There are no limits on the number of visits or payments. Dispensary, visual screening for third parties, and contact lenses are not insured services.

TABLE I.1.1

NUMBER OF OPTOMETRISTS

IN BRITISH COLUMBIA, 1970 to 1979

YEAR	MEDICAL SERVICE PLAN	HEALTH MANPOWER RESEARCH UNIT	BRITISH COLUMBIA OPTOMETRIC ASSOCIATION
1970	-	-	146
1971	-	-	149
1972	-	-	147
1973	-	152	148
1974	-	-	161
1975	-	-	158
1976	159	-	164
1977	161	171	168
1978	165	-	164
1979	162	173	163

Notes: 1. The Medical Services Plan count includes only optometrists billing the plan during the fiscal year ending. They were obtained through correspondence with the plan.

2. The Health Manpower Research Unit count includes optometrists with British Columbia registration who are resident in British Columbia. The source is Roll Call 1979 and Vision Care Needs and Manpower in British Columbia, 1974.

3. The count provided by the British Columbia Optometric Association includes registered optometrists who are in active practice.

TABLE I.1.2

TOTAL NUMBER OF ACTIVE

OPTOMETRISTS IN BRITISH COLUMBIA BY AGE, 1979

AGE GROUP	MALE	FEMALE	TOTAL
20 - 24	1	0	1
25 - 29	11	3	14
30 - 34	16	3	19
35 - 39	10	1	11
40 - 44	11	0	11
45 - 49	7	0	7
50 - 54	13	2	15
55 - 59	21	0	21
60 - 64	28	1	29
65 and over	14	2	16
Unknown	17	2	19
Total	149	14	163

Source: The data was provided by the British Columbia Optometric Association.

TABLE I.1.3

FACTORS AFFECTING MANPOWER SUPPLY

OPTOMETRY, BRITISH COLUMBIA

FACTOR	ASSUMPTION	SOURCE
Opening stock	175	BCOA records
Net migration	7	Interview with BCOA
Net immigration	1	Interview with BCOA
Net occupational shifts	0	Interview with BCOA
Training output	0	No training program exists
Active/inactive Attrition	0 1979 age distribution and retirement at 65	Interview with BCOA

Notes: BCOA is British Columbia Optometric Association

c) Assumptions

i Stock

. Historical stock 1970 to 1979 - The total number of active optometrists in British Columbia from 1970 to 1979 is shown in Table I.1.1, opposite. The count provided by the Health Manpower Research Unit includes all optometrists registered in the province at British Columbia addresses, whereas the British Columbia Optometric Association (BCOA) includes only registered optometrists who are in active practice. The Medical Services Plan count defines the number of optometrists as those billing the plan for optometric services during the fiscal year. The differences in definition account for the discrepancies in total numbers. The BCOA data was used for historical manpower supply analysis.

. Current stock - The most current information regarding the stock of active optometrists in British Columbia is presented in Table I.1.2, opposite. The age distribution was derived from the results of the 1979 membership survey of the British Columbia Optometric Association. In 1979, 163 optometrists were registered and active. Currently in 1980, the BCOA has 175 active members.

ii Factors Affecting Manpower Supply

Table I.1.3, opposite, shows the assumptions with

respect to each of the factors which have the potential to affect stock; that is, migration, immigration, occupational shifts, training output, active to inactive movements, and attrition. Each of these factors is discussed in more detail in the following sections.

. Net migration - Data specific to inter-provincial migration of optometrists is not available. However, estimates of net migration have been derived by using data on new registrants, supplemented by interview information with the President of the BCOA. About 6 graduates from the School of Optometry, University of Waterloo set up practice in British Columbia each year. In addition, 1 previously registered optometrist from elsewhere in Canada relocates to British Columbia each year. As there is virtually no outmigration of optometrists from British Columbia, we have assumed a rate of net migration of 7 persons per year over the forecast period.

. Net immigration - According to the BCOA, 1 graduate from a School of Optometry in the United States registers and sets up practice in British Columbia in an average each year. The reported emigration of optometrists from British Columbia is nil, hence, we have assumed the net immigration of 1 practitioner per year over the forecast period.

. Net occupational shifts - The lengthy training program for optometry precludes the upgrading of a related occupational group over a short period of

time. As well, the BCOA indicated that only 1 optometrist has left the profession prior to retirement. The variable is therefore assumed to be zero from 1981 to the year 2000.

. Training output - As the Government of British Columbia does not have a contractual agreement with Ontario to reserve places in the School of Optometry, University of Waterloo, we have assigned a value of zero to this variable from 1981 to the year 2000.

. Active to inactive - The BCOA Executive indicated in an interview that there are no inactive optometrists in British Columbia, although a number of practitioners near retirement work only part-time. These part-time practitioners are included in the definition of active optometric manpower as the distribution of full to part-time practitioners is not known.

The future stock of optometrists may be affected if female labour force participation is less than males. While females now make up 60% of the enrolment in the two Schools of Optometry in Canada, there are only 14 female optometrists in the province, representing about 8% of the active stock. The BCOA reports that historically, British Columbia female optometrists have had a working life pattern similar to their male counterparts. For this reason, we have assigned a value of zero to the active to inactive flows over the forecast period.

TABLE I.1.4

TOTAL PAYMENTS FOR OPTOMETRIC SERVICES BY

AGE AND SEX OF PATIENT, BRITISH COLUMBIA, 1980

AGE GROUP	MALE	FEMALE	
Under 1	663	901	
1 - 4	26,221	25,251	
5 - 14	224,688	262,986	
15 - 24	297,205	523,121	
25 - 44	608,318	836,340	
45 - 64	632,424	671,032	
65 - 74	158,071	154,768	
Over 75	49,287	47,664	
Total	1,996,877	2,522,063	4,518,940
Unknown			910,064
Grand Total			5,420,004

Notes: The data was provided by the Medical Service Plan, Ministry of Health.
As service counts were considered unreliable, payment data was used.
The payment data is based on date of payment, not date of service.

TABLE I.1.5

TREND IN PER CAPITA UTILIZATION

OF OPTOMETRIC SERVICES IN BRITISH COLUMBIA

YEAR	PAYMENT IN CURRENT $	PAYMENT IN 1976 $ (000)	POPULATION	PAYMENT IN 1976 $/P
1976	$3,459,293	$3,459.00	2,476.1	$1.40
1977	$4,135,563	$3,824.00	2,506.4	$1.53
1978	$4,437,426	$3,878.00	2,545.3	$1.52
1979	$4,916,627	$4,019.00	2,591.8	$1.55
1980	$5,420.004	$4,219.00	2,626.4	$1.61

Notes: 1. Annual compound percentage increase of 3.6% in payments in 1976 $.

. Attrition from death and retirement - We estimated attrition from retirement based on the 1979 optometric age distribution, and retirement at age 65. Attrition from death was not estimated separately due to the high joint probability of death and retirement, and the relatively small size of the occupational group.

iii. Requirements

. Historical population ratio - The 1980 ratio of optometrists to total population of 1:14,989 was used to generate the required number of optometrists to maintain the current level of service over time.

. Utilization - Table I.1.4, opposite, shows total payments for optometric services, by age and sex of patient. These were used to develop specific age-sex utilization rates. These rates were applied to the age-sex population forecasts, and manpower requirements were then projected. Table I.1.5, opposite, shows the trend in per capita utilization.

. Service target ratios - Requirements were projected for a service target ratio of optometrist to 10,000 population, as recommended by Health and Welfare Canada and supported by the Canadian Optometric Association.

TABLE I.1.6

NET REQUIREMENTS, BRITISH COLUMBIA, OPTOMETRY

(Incremental and Cumulative)

YEAR	Low Population Scenario						Medium Population Scenario						High Population Scenario					
	LOW		MEDIUM		HIGH		LOW		MEDIUM		HIGH		LOW		MEDIUM		HIGH	
	A	A	C	C	B	B	A	A	C	C	B	B	A	A	C	C	B	B
1981	4	4	4	4	92	92	5	5	5	5	94	94	7	7	6	6	97	97
1982	5	9	5	9	6	98	6	11	6	11	8	102	6	13	6	12	8	105
1983	5	14	5	14	7	105	6	17	5	16	7	109	6	19	6	18	8	113
1984	5	19	5	19	6	111	5	22	6	22	8	117	6	25	6	24	8	121
1985	4	23	5	24	6	117	6	28	6	28	8	125	6	31	6	30	8	129
1990	-2	21	-1	23	5	122	2	30	2	30	11	136	5	36	5	35	16	145
1995	-10	11	-8	15	-4	118	-6	24	-4	26	1	137	-3	33	-2	33	6	151
2000	-1	-10	-12	3	-16	102	-18	6	-14	12	-10	127	-15	18	-11	22	-6	145

Requirements derived using:

A. Historical ratio approach of 1:14,989 achieved in 1980
B. Service target ratio approach of 1:10,000
C. Utilization based on last year. No productivity increase.

TABLE I.1.7

PROJECTED NET MANPOWER REQUIREMENT FOR OPTOMETRISTS

UNDER VARYING SERVICE DEMAND SCENARIOS

PROVINCE: BRITISH COLUMBIA

YEAR	Projected Growth In Utilization of Services									
	1%		1.5%		2.0%		2.5%		3.0%	
	I	C	I	C	I	C	I	C	I	C
1981	7	7	9	9	9	9	10	10	10	10
1982	4	11	5	14	5	15	8	18	8	18
1983	4	15	4	18	6	20	7	25	8	26
1984	0	15	2	20	4	24	3	28	3	29
1985	3	18	10	30	8	32	10	38	13	42
1990	-4	14	-3	27	2	34	10	48	15	57
1995	-18	-4	-12	15	-4	28	-1	47	8	65
2000	-30	-34	-23	-8	-18	10	-9	38	-1	64

Notes: 1) Projected under medium population scenario
2) I = Incremental, C = Cumulative

1) In the absence of number of services information from the British Columbia Government, number of services information for 1976 as reported in the Vision Care Task Force Report was combined with the 1976 insured payments to develop a per capita cost per service. This was then projected forward to 1980 (in 1976) to yield an indicator of per capita utilization of services (in services). This value was then subjected to growth in utilization of 1%, 1 1/2%, 2%, 2 1/2%, and 3% for the 20 year period.
2) The procedure outlined in Note 1 above, was also used to develop an estimate of services per practitioner. This value was increased at 2% per annum to account for productivity factors.

d) Net Manpower Requirements

Table I.1.6, opposite, shows the net manpower requirements (incremental and cumulative) for optometry.

. Highlights - Based on the medium population scenario the requirement for manpower is approximately the same for the historical population and utilization approaches. Under these projection approaches, there is a requirement for approximately 3 additional practitioners per year until 1990, and a surplus of approximately 2 per year from 1990 to 2000.

Based on the service target approach, there is an immediate requirement for 94 additional practitioners, with an additional requirement for approximately 8 practitioners per year until 1990, and a surplus of approximately 1 per year from 1990 to 2000.

. Sensitivity Analysis

Manpower requirements were projected under five scenarios of varying demand for services. Table I.1.7, opposite, shows the projected net manpower requirement for an annual increase in service demand of 1%, 1.5%, 2%, 2.5% and 3%, based on the medium population projection. Per practitioner rates were projected using an annual increase in productivity of 2%.

Based on an annual increase in demand for services of 2%, there is a net requirement for approximately 10 additional practitioners by the year 2000.

3.2.2 ALBERTA

a) Legal Controls - The Optometry Act of Alberta defines optometry as:

> "the examination of the human eye and related structures to determine the presence of vision problems and the prescribing and adapting of lenses, frames, mountings, contact lenses or other aids and the utilization of vision training, to preserve, restore and enhance vision efficiency."

Only persons who hold a certificate of registration issued by the Board of Examiners established under the act are authorized to practice optometry. To be qualified as an optometrist, an applicant must meet the educational and professional standards set by the Board, as well as be 18 years of age.

b) Insured Services

Optometric services are insured under the Alberta Health Care Insurance Plan. Insured services are restricted to one eye examination including refraction and the writing of a prescription for the fitting of glasses each year. The Basic Health Services Program does not pay for the fitting or cost of glasses. However, the Extended Health Benefits Program provides optical services without payment for residents 65 and over, their spouses and dependents.

TABLE I.2.1

TOTAL NUMBER OF

OPTOMETRISTS IN ALBERTA, 1970 to 1979

YEAR	ALBERTA HEALTH CARE INSURANCE PLAN[1]	ALBERTA SOCIAL SERVICES AND COMMUNITY HEALTH[2]	ALBERTA OPTOMETRIC ASSOCIATION[3]
1970	118	-	129
1971	125	-	128
1972	132	-	129
1973	139	144	141
1974	148	-	158
1975	156	-	163
1976	160	168	167
1977	167	167	173
1978	167	173	173
1979	166	173	173

Notes:

1. Alberta Health Care Insurance Plan includes registered optometrists billing the plan for refractions. The data was summarized from the annual reports.

2. Alberta Social Services and Community Health count includes registered optometrists active in Alberta. The source is Health and Social Service Manpower in Alberta, 1979.

3. Alberta Optometric Association count includes the number of registered optometrists active in Alberta. The data was obtained from the Canada Manpower Inventory Registrar.

TABLE I.2.2

TOTAL NUMBER OF ACTIVE OPTOMETRISTS REGISTERED IN ALBERTA, BY AGE, 1980

AGE GROUP	NUMBER
25 or less	8
26 - 30	25
31 - 35	36
36 - 40	24
41 - 45	10
46 - 50	10
51 - 55	13
56 - 60	25
Over 60	25
Unknown	8
Total	184

Notes: 1. The Alberta Optometric Association provided the age distribution of active optometrists registered in Alberta from a recent survey of their membership.

2. The unknown category includes 7 new 1980 graduates and 1 non-respondent.

TABLE I.2.3

FACTORS AFFECTING MANPOWER SUPPLY

OPTOMETRY, ALBERTA

FACTOR	ASSUMPTION	SOURCE
Stock	184	AOA records[1]
Net migration	1	Interview with AOA Executive
Net immigration	1	Interview with AOA Executive
Net occupational shifts	0	Interview with AOA Executive
Training output	5	Interview with AOA Executive
Active/inactive	0	Interview with AOA Executive
Attrition	Retirement at 65	1980 AOA survey
	Retirement intentions	1980 AOA survey

Notes: 1. ADA is Alberta Optometric Association

c) Assumptions

i. Stock

. Historical stock 1970 to 1979 - The total number of active optometrists in Alberta from 1970 to 1979 is shown in Table I.2.1, opposite. The counts provided by Alberta Social Services and Community Health and the Alberta Optometric Association (AOA) include all optometrists residing in the province and holding an active registration. The Alberta Health Care Insurance Plan count includes only optometrists registered in the province who billed the plan for refractions during the fiscal year. The differences in definition account for the discrepancies in total numbers. The AOA data was used in the historical manpower supply analysis.

. Current stock 1980 - The most current information regarding the stock of active optometrists in Alberta is presented in Table I.2.2, opposite. The age distribution of optometrists was derived from the results of the 1980 membership survey by the Alberta Optometric Association. In total, 184 optometrists are registered and active in the province.

ii Factors Affecting Manpower Supply

Table I.2.3, opposite, shows the assumptions made with respect to each of the factors which have the

potential to affect stock; that is, migration, immigration, occupational shifts, training output, active to inactive movements, and attrition. Each of these factors is discussed in more detail in the sections following.

. Net migration - Data specific to inter-provincial migration of optometrists is not available. However, estimates of net migration have been derived using interview information provided by the Association Executive. We have assumed that 1 recent graduate from the University of Waterloo previously resident in another province locates in Alberta each year.

. Net immigration - According to the AOA Executive, an average of 1 recent graduate from a School of Optometry in the United States has located in Alberta each year. Consequently, we have assumed the net immigration of 1 practitioner per year over the forecast period.

. Net occupational shift - The lengthy training program for optometry precludes the upgrading of a related occupational group over a short period of time. As well the AOA Executive indicated that only 2 Alberta optometrists in the last 20 years have left the profession prior to retirement. The variable is therefore assumed to be zero from 1981 to the year 2000.

. Training output - The Alberta-Ontario training agreement provides for 7 places per year for

Alberta residents at the School of Optometry at Waterloo. Candidates applying must meet the School's qualifications standards. This contract was recently renewed and extends to the academic year 1984-1985. According to the AOA Executive, approximately 5 students per year are expected to complete the program and return to practice in the province. This training output is assumed to continue until 2000.

. Active to inactive - The AOA Executive indicated in an interview that there are no inactive optometrists in Alberta, although a number are only part-time. These part-time practitioners are included in the definition of active optometric manpower as the distribution of full to part-time practitioners is not known.

The future stock of optometrists may be affected by the age-sex distribution, if female labour force participation is less than that of males. While females now make up 60% of the enrolment in the two Schools of Optometry in Canada, there are only 11 female optometrists, representing less than 6% of the total active stock in Alberta. The AOA Executive reports that historically, Alberta female optometrists have remained active during their childbearing years. For this reason, the value for active to inactive flows is assigned to zero over the forecast period.

TABLE I.2.4

RETIREMENT INTENTIONS OF

ALBERTA OPTOMETRISTS, 1980

YEARS	NUMBER
0 - 5	41
5 - 10	29
10 - 15	22
15 - 20	18
20 - 25	21
25 - 30	18
Over 30	27

Notes: 1. Retirement intentions are based on the 1980 AOA survey of its membership. Data was not available from 7 new graduates and 1 non-respondent.

TABLE I.2.5

TOTAL NUMBER OF OPTOMETRIC SERVICES

BY AGE AND SEX OF PATIENT, ALBERTA, 1977 to 1979

	1977 to 1978	1978 to 1979
Male		
Under 1	7	11
1 - 4 years	795	880
5 - 14	18,904	19,632
15 - 24	23,874	23,880
25 - 44	29,502	31,812
45 - 64	26,540	26,872
65 and over	12,026	12,057
Total	111,648	115,144
Female		
Under 1	8	14
1 - 4 years	758	881
5 - 14	22,530	22,414
15 - 24	38,269	38,236
25 - 44	40,531	44,270
45 - 64	29,661	29,942
65 and over	13,037	13,580
Total	144,794	149,337

Notes: 1. Data source is the Alberta Health Care Insurance Plan.

. Attrition from death and retirement - We estimated attrition from death and retirement based on the 1980 age distribution and assumed retirement at 65. Data on age and retirement intentions were gathered during the 1980 AOA survey of its membership. The age distribution is found in Table I.2.2, while retirement intentions are shown in Table I.2.4, opposite. The AOA Executive indicated that there is a trend to early retirement since the profession is physically demanding. Attrition through death was not estimated separately, due to the high joint probability of death and retirement and the small size of the occupational group.

iii Requirements

. Historical population ratio - The 1980 ratio of optometrists to total population of 1:11,764 was used to generate the required number of optometrists to maintain the current level of services over time.

. Utilization - The total number of refractions by patient age and sex, performed by optometrists for 1977-1978 and 1978-1979 was obtained from the Alberta Health Care Insurance Plan and is presented in Table I.2.5, opposite. The data includes services provided to Alberta residents by optometrists billing the plan but excludes refractions performed by ophthalmologists and general practitioners.

TABLE I.2.6

TREND IN PER CAPITA UTILIZATION

OF OPTOMETRIC SERVICES IN ALBERTA

YEAR	SERVICES	POPULATION (000)	SERVICES/POPULATION
1972	175,478	1,670.6	.105
1973	188,789	1,702.6	.111
1974	209,764	1,741.4	.120
1975	217,280	1,799.0	.121
1976	227,209	1,860.7	.122
1977	238,781	1,919.1	.124
1978	229,048	1,976.1	.116
1979	257,461	2,034.7	.127
1980	264,482	2,068.8	.129

Notes: 1. Compound increase of 2.6% in per capita services.

TABLE I.2.7

NUMBER OF REFRACTIONS PERFORMED BY OPTOMETRISTS AND OPHTHALMOLOGISTS, ALBERTA, 1978 to 1979 and 1979 to 1980

REFRACTIONS	1978 to 1979	1979 to 1980
Optometrists	256,442	264,481 (64%)
Ophthalmologists	146,940	149,280 (36%)
	403,382	413,761

Source: The Alberta Health Care Insurance Plan.

Table I.2.6, opposite, shows the trend in per capita utilization of optometric services in Alberta.

The average number of optometric services provided to each age-sex grouping for 1979 and 1980, was used to develop specific utilization rates. These rates were applied to the projected age-sex population, and manpower requirements were then projected under several productivity scenarios. In 1980, each optometrist on average performed 1,437 optometric eye examinations. We made projections assuming 1% and 2% compound annual increases in productivity resulting in 1,884 and 2,317 refractions per optometrist respectively, by 2000.

The number of refractions performed by ophthalmologists and optometrists in 1978-1979 and 1979-1980 is compared in Table I.2.7, opposite. The optometrists performed almost 65% of total refractions in 1979 and 1980. However, the number of refractions performed by ophthalmologists may be understated, as refractions could be included in other fee codes as well.

. Service target ratio - Requirements were projected for a service target ratio of 1 optometrist to 10,000 population, as recommended by Health and Welfare Canada and supported by the Canadian Optometric Association.

TABLE I.2.8

NET REQUIREMENTS, ALBERTA, OPTOMETRY

(Incremental and Cumulative)

YEAR	Low Population Scenario						Medium Population Scenario						High Population Scenario					
	LOW		MEDIUM		HIGH		LOW		MEDIUM		HIGH		LOW		MEDIUM		HIGH	
	B	B	A	A	C	C	B	B	A	A	C	C	B	B	A	A	C	C
1981	6	6	6	6	31	31	8	8	8	8	33	33	9	9	10	10	35	35
1982	5	11	6	12	6	37	7	15	9	17	10	43	6	15	8	18	9	44
1983	6	17	5	17	6	43	8	23	9	26	10	53	7	22	7	25	8	52
1984	5	22	6	23	7	50	8	31	8	34	9	62	8	30	9	34	10	62
1985	5	27	5	28	5	55	7	38	7	41	8	70	7	37	8	42	9	71
1990	15	42	14	42	17	72	23	61	25	66	29	99	30	67	32	74	37	108
1995	8	50	6	48	8	80	19	80	16	82	20	119	28	95	26	100	31	139
2000	5	55	0	48	2	82	17	97	12	94	15	134	26	121	22	122	27	166

Requirements derived using:

A. Historical ratio approach of 1:11,316 achieved in 1979
B. Utilization approach based on current services. No productivity
C. Service target ratio approach of 1:10,000

Note: Attrition by survey of retirement intentions.

(d) Net Requirements

Table I.2.8, opposite, shows the net manpower requirements (incremental and cumulative) for optometry.

. Highlights - Based on the medium population scenario, the requirement for manpower is approximately the same for the historical population and utilization approaches. Under these projection approaches, there is a requirement for approximately 7 additional practitioners per year until 1990, and a requirement for approximately 3 additional practitioners per year from 1991 to 2000.

Based on the service target approach, there is an immediate requirement for 33 additional practitioners, with an additional requirement for approximately 7 per year until 1990, and a requirement for approximately 4 per year from 1990 to 2000.

. Sensitivity Analysis - The above three approaches were tested to determine their sensitivity to the level of training output assumed. No graduates from the University of Waterloo were added to the stock of optometrists after 1989. As a result, in all three approaches, the acuteness of the optometric shortage is intensified by the need for 7 more optometrists per year.

TABLE I.2.9

PROJECTED NET MANPOWER REQUIREMENT FOR OPTOMETRISTS

UNDER VARYING DEMAND FOR SERVICE SCENARIOS

PROVINCE: ALBERTA

	Projected Growth In Utilization of Services									
YEAR	1%		1.5%		2.0%		2.5%		3.0%	
	I	C	I	C	I	C	I	C	I	C
1981	9	9	10	10	11	11	14	14	16	16
1982	3	12	5	15	7	18	7	21	8	24
1983	3	15	4	19	6	24	6	27	8	32
1984	4	19	5	24	4	28	8	35	9	41
1985	0	19	3	27	5	33	6	41	6	47
1990	15	34	20	47	27	60	33	74	43	90
1995	17	51	25	72	34	94	44	118	53	143
2000	13	64	20	92	29	123	41	159	53	196

Notes: 1) Projected under medium population scenario
2) I = Incremental, C = Cumulative

In addition, manpower requirements were projected under a varying demand for services. Table I.2.9, opposite, shows the projected manpower requirement, and net requirement for an annual increase in service demand of 1%, 1.5%, 2%, 2.5% and 3%, based on medium population projection. Per practitioner rates were projected based on an annual increase in productivity of 2%.

Based on an annual increase in demand for services of 2%, there is a net requirement for approximately 123 additional practitioners by the year 2000, or approximately 6 additional practitioners per year.

3.2.3 SASKATCHEWAN

a) Legal Controls - The Optometry Act (R.S.S. 1978 Ch O-6) regulates the practice of optometry in Saskatchewan to

"any means other than drugs, medicine or surgery for the measurement or aid of the powers of vision or the supplying of lenses or prisms for the aid therefore."

An optometrist must be eighteen years of age and be resident in Saskatchewan in order to be licensed to practice. The Council of the Saskatchewan Optometric Association is empowered by the Act to enforce and establish regulations pertaining to registration, examination, discipline and complaints.

b) Insured Services

Since May 1975, The Saskatchewan Medical Care Insurance Commission has insured optometric services for registered Saskatchewan residents, to the extent of one eye examination to determine refractive error once in any 12 month period, unless special medical factors are present. Prior to 1975, the number of visits insured over a three year period was restricted for certain age groups.

c) Assumptions

i. Stock

. Historical stock 1970 to 1980 - The total number

TABLE I.3.1

TOTAL NUMBER OF OPTOMETRISTS IN

SASKATCHEWAN, 1970 to 1980

		SASKATCHEWAN MEDICAL CARE INSURANCE COMMISSION		
YEAR	SASKATCHEWAN OPTOMETRIC ASSOCIATION	SASKATCHEWAN EXCLUDING SWIFT CURRENT REGION	SWIFT CURRENT REGION	TOTAL
1970	74	63	-	63
1971	73	63	-	63
1972	73	66	-	66
1973	73	65	6	71
1974	77	60	6	66
1975	80	61	6	67
1976	81	69	6	75
1977	85	74	6	80
1978	92	77	6	83
1979	90	72	6	78
1980	89	N/A	N/A	N/A

Notes:
1. The SOA count includes all resident optometrists holding an active registration in Saskatchewan.
2. The SMCIC count includes all optometrists receiving $4,000 and more from 1970 to 1973 and receiving $10,000 and more thereafter from the SMCIC during a period of one year.
3. The Swift Current Region figures are approximations provided by the Health Region by telephone on October, 1980.

TABLE 1.3.2

TOTAL NUMBER OF ACTIVE

RESIDENT SASKATCHEWEN

OPTOMETRISTS, BY AGE AND SEX, 1979

AGE GROUP	MALE	FEMALE	TOTAL
Less than 20	-	-	-
20-24	-	-	-
25-29	4	-	4
30-34	15	-	16
35-39	9	-	9
40-44	5	-	5
45-49	7	-	7
50-54	8	-	8
55-59	16	-	16
60-65	3	-	3
65 and over	-	-	-
Unknown	N/A	N/A	15
Total			83

Source: Saskatchewan Medical Care Insurance Commission, August, 1980

Notes:
1. The unknown category includes optometrists receiving between $10,000 and $20,000 per year from SMCIC.
2. The age-sex distribution applies to optometrists receiving $20,000 or more in SMCIC payments during the year, and practising in Saskatchewan at the end of the year.
3. The unknown category includes optometrists in the Swift Current area.

of active optometrists from 1970 to 1980 is shown in Table I.3.1, opposite. The count provided by the Saskatchewan Optometric Association (SOA) includes all optometrists residing in Saskatchewan and holding an active registration. The Saskatchewan Medical Care Insurance Commission (SMCIC) count includes only optometrists who received more than a specified level of payment from the SMCIC during a one year period. This difference in definition accounts for the discrepancies in the total numbers. The SOA data was used.

The Swift Current Health Region operates separately from the rest of the province. Optometrists in that region bill the Swift Current Health Region rather than the SMCIC, or are employed directly by the Health Region. For this reason, their numbers are not included in the SMCIC count.

. Current stock 1979 - The most current information regarding the stock of active optometrists in Saskatchewan is presented in Table I.3.2, opposite.

The age and sex distribution of optometrists in 1979 was derived from SMCIC records. This distribution is not available for optometrists working in the Swift Current Health Region and for optometrists earning between $10,000 and $20,000 per year. The Saskatchewan Optometric Association reports a total of 89 registered resident optometrists in 1980.

TABLE I.3.3

FACTORS AFFECTING MANPOWER SUPPLY

OPTOMETRY, SASKATCHEWAN

FACTOR	ASSUMPTION	SOURCE
Stock	89	S.O.A.
Net migration	1.5 per year	S.O.A., Sask. Health Manpower Annual Report
Net immigration	0 per year	S.O.A.
Net occupational shifts	0 per year	
Training output	2 per year	School of Optometry, University of Waterloo
Active/inactive	0 per year	S.O.A.
Attrition	1979 age distribution and retirement at 65 plus survey of retirement intentions	S.M.C.I.C. age distribution, Canadian Optometric Association

Notes: S.O.A. is Saskatchewan Optometric Association

ii. Factors Affecting Manpower Supply

Table 1.3.3 opposite, shows the assumptions made with respect to each of the factors which have the potential to affect stock, that is, migration, immigration, occupational shifts, training output, active to inactive movements and attrition. Each of these factors is discussed in more detail in the sections following.

. Net migration - Data specific to interprovincial migration of optometrists are not available. However, estimates of net migration have been derived using interview information provided by the Association's President and adjusted attrition data from the Saskatchewan Health Manpower Annual Report 1978. A net migration of three optometrists is assumed every two years, with one optometrist arriving in the first year and two in the second.

. Net immigration - According to the SOA president, international migration of optometrists has been historically non-existent. On the basis of this information, the factor has been assigned a value of zero throughout the forecast period.

. Net occupational shifts - The lengthy training program for optometry precludes the upgrading of a related occupational group over a short period of time. The factor is therefore assumed to be zero from 1981 to the year 2000.

. Training output - The Province of Saskatchewan holds a contractual agreement with the University

of Waterloo, to purchase up to three places in the School of Optometry, provided candidates meeting the School's qualification standards apply. This contract was recently renewed and extends to the academic year of 1984-1985. To date, only one year's experience from the agreement is available for graduates. It is assumed that only 2 of the 3 students at Waterloo will return to practice in Saskatchewan. This assumption is tested in the sensitivity analysis.

. Active to inactive flows - The SOA president indicated in an interview that there are no inactive optometrists in Saskatchewan, although a number are only part-time practitioners. The SMCIC however, defines "active" as the level of payments received by an optometrist in a full year period. Optometrists not meeting this criteria are part-time practitioners and excluded from the active stock. Historically, the number of optometrists falling in the part-time category has averaged about 9 per year. If these individuals provide services to patients about 30% of a normal working week, then the net requirements would be over-stated by approximately 3 optometrists. No attempt to adjust the active data by this number was undertaken.

At the present time, female enrolments at the two Canadian schools of optometry account for 60% of all students. The future stock of optometrists may be affected by this distribution, if female labour force participation is less than that of

TABLE I.3.4

TOTAL NUMBER OF OPTOMETRIC SERVICES, SASKATCHEWAN

BY AGE & SEX OF PATIENT, 1973 TO 1979

	1973	1974	1975	1976	1977	1978	1979
MALE							
0 - 14 yrs.	10,546	10,982	10,756	10,974	11,223	11,186	12,167
15 - 44	16,269	17,100	19,936	22,039	23,838	25,437	28,402
45 - 64	12,603	12,874	14,103	14,413	14,747	14,830	16,428
65 & over	6,299	6,367	6,834	7,455	7,780	8,055	8,805
TOTAL	45,717	47,323	51,629	54,881	57,588	59,508	65,802
FEMALE							
0 - 14 yrs.	13,791	14,032	13,623	13,652	13,808	13,911	14,455
15 - 44	25,998	26,705	31,499	35,048	37,255	40,546	43,845
45 - 64	15,139	15,625	17,116	17,674	18,002	18,400	19,784
65 & over	7,129	7,343	8,179	9,231	10,043	10,253	11,827
TOTAL	62,057	63,705	70,417	75,605	79,108	83,110	89,911
GRAND TOTAL	107,774	111,028	122,046	130,486	136,696	142,618	155,713

Source: Saskatchewan Medical Care Insurance Commission, August 25, 1980

Notes: 1. The total service figures include those provided to Saskatchewan residents outside their province .

2. Services only include those provided by optometrists.

males. The SOA president reports that historically, Saskatchewan female optometrists have remained active during their childbearing years. For this reason, and given the lack of information to the contrary, the value for active to inactive flows is assigned to zero over the forecast period.

. Attrition from death and retirement - A 1979 survey by the Canadian Optometric Association (Optometric Manpower, File 3.5, Saskatchewan Optometry, 1979) of retirement intentions of its members over 50 years of age was used to estimate retirements. The survey data included an unknown category which was age-distributed using SMCIC data, and assumed to retire at age 65.

iii. Requirements

. Historical population ratios - The 1979 ratio of optometrists to total population of 1:14,058 was used to generate the required number of optometrists to maintain the current level of services over time. The highest historical ratio of 1:13,355, achieved in 1976, was also used.

. Utilization - The total number of refractions by patient age and sex, performed by optometrists from 1973 to 1979 was obtained from the Saskatchewan Medical Care Insurance Commission and is presented in Table I.3.4, opposite. The data excludes refractions performed by ophthalmologists and general practitioners, but include services

TABLE I.3.4 (A)

TREND IN PER CAPITA UTILIZATION

OF OPTOMETRIC SERVICES IN SASKATCHEWAN, 1973 to 1979

YEAR	TOTAL SERVICES	POPULATION	SERVICES PER POPULATION (PER CAPITA)
1973	107,774	908.10	0.119
1974	111,028	906.70	0.122
1975	122,046	917.9	0.133
1976	130,486	921.5	0.142
1977	136,966	937.2	0.146
1978	142,618	947.6	0.151
1979	155,713	955.92	0.163

Source: Saskatchewan Medical Care Insurance Commission

TABLE I.3.5

TOTAL NUMBER OF REFRACTIONS

PERFORMED IN SASKATCHEWAN, 1970 TO 1979

	OPTOMETRISTS	OPHTHAMOLOGISTS[1]	OTHER PHYSICIANS	TOTAL
1970	82,443	33,796	9,560	125,799
1971	90,187	35,895	11,043	137,125
1972	97,759	38,961	11,818	148,538
1973	105,072	42,259	11,130	158,461
1974	108,313	39,917	11,637	159,867
1975	119,485	34,119	13,307	166,911
1976	127,431	40,147	15,032	182,610
1977	133,569	37,061	14,607	185,237
1978	139,841	37,153	14,623	191,617
1979	152,648	34,842	14,809	202,299

Source: Saskatchewan Medical Care Insurance Commission, August 25, 1980

Notes: 1. Includes combined ophthamologists and otolaryngologists

2. Includes in-province practitioners only.

TABLE I.3.6

NET REQUIREMENTS, SASKATCHEWAN, OPTOMETRY

(Incremental and Cumulative)

YEAR	Low Population Scenario						Medium Population Scenario						High Population Scenario					
	LOW		MEDIUM		HIGH		LOW		MEDIUM		HIGH		LOW		MEDIUM		HIGH	
	B	B	A	A	C	C	B	B	A	A	C	C	B	B	A	A	C	C
1981	1	1	1	1	6	6	1	1	1	1	7	7	4	4	4	4	10	10
1982	-1	0	-1	0	-1	5	-1	0	-1	0	-1	6	-1	3	0	4	0	10
1983	-2	-2	-2	-2	-2	3	-1	-1	-1	-1	-1	5	-1	2	-2	2	-1	9
1984	-3	-5	-4	-6	-3	0	-3	-4	-3	-4	-3	2	-2	0	-2	0	-2	7
1985	8	3	8	2	8	8	9	5	8	4	9	11	9	9	9	9	9	16
1990	0	3	0	2	0	8	2	7	3	7	3	14	6	15	7	16	7	23
1995	-12	-9	-12	-10	-12	-4	-8	-1	-9	-2	-9	5	-4	11	-5	11	-4	19
2000	-10	-19	-11	-21	-10	-14	-6	-7	-7	-9	-7	-2	-2	9	-2	9	-2	17

Requirements derived using:

A. Historical ratio approach of 1:10,621 achieved in 1976
B. Utilization approach using curent services. No productivity
C. Service target ratio approach of 1:10,000

provided to Saskatchewan residents out-of-province, as well as services provided by optometrists defined by the SMCIC as inactive. The implications of these data limitations are an over-estimation of per capita services provided by resident optometrists, and an over-estimation of per practitioner services provided by active optometrists. The two effects tend to balance each other out.

Table I.3.4 (A) opposite, shows the trend in per capita utilization of optometric services in Saskatchewan 1973 to 1979. The proportion of refractions performed by ophthalmologists since 1970, has declined from 26% to 17% of the total. (See Table I.3.5 on the opposite page). Refractions performed by general practitioners have maintained a constant 7% of total refractions from 1970 to 1979.

· Service target ratio - Requirements were projected using a service target ratio of 1:10,000.

d) Net Requirements

Table I.3.6, opposite, shows the net manpower requirements (incremental and cumulative) for optometry.

· Highlights - Based on the medium population scenario, the requirement for manpower is approximately the same for the historical

TABLE I.3.7

PROJECTED NET MANPOWER REQUIREMENT FOR OPTOMETRISTS

UNDER VARYING DEMAND FOR SERVICE SCENARIOS

PROVINCE: SASKATCHEWAN

	Projected Growth In Utilization of Services									
YEAR	1%		1.5%		2.0%		2.5%		3.0%	
	I	C	I	C	I	C	I	C	I	C
1981	3	3	4	4	5	5	6	6	7	7
1982	-1	2	-1	3	0	5	0	6	0	7
1983	-3	-1	-2	1	-2	3	-1	5	0	7
1984	-3	-4	-3	-2	-2	1	-2	3	-1	6
1985	7	3	8	6	8	9	9	12	9	15
1990	0	3	2	8	5	14	8	20	11	26
1995	-5	-2	-1	7	1	15	5	25	9	35
2000	-2	-4	0	7	4	19	7	32	12	47

Notes: 1) Projected under medium population scenario
2) I = Incremental, C = Cumulative

population and utilization approaches. Under these projection approaches, there is a requirement for approximately 7 additional practitioners between 1981 and 1990 and a surplus of 7 under the utilization approach, and 9 under the historical population approach by the year 2000.

Based on the service target approach, there is an immediate requirement for 7 additional practitioners, and an additional 7 from 1981 to 1990. Between 1991 and 2000 there is an approximate surplus of 2 per year.

. Sensitivity Analysis - The above three approaches were tested to determine their sensitivity to the level of training output assumed. No graduates from the University of Waterloo were added to the stock of optometrists after 1989. As a result, the surplus manpower projected became a net requirement for an additional 2 practitioners per year, from 1990 to 2000.

In addition, manpower requirements were projected under a varying demand for services. Table I.3.7, opposite, shows the projected manpower requirement and a net requirement for an annual increase in service demand of 1%, 1.5%, 2%, 2.5% and 3%, on medium population projection. Per practitioner rates were based on an annual increase in productivity of 2%.

Based on an annual increase in demand for services of 2%, there is a net requirement for 19 additional practitioners by the year 2000, or approximately 1 additional practitioner per year.

3.2.4 MANITOBA

a) Legal Controls - An Act to Regulate the Practice of Optometry (SM 1957, C.48, S.1) defines optometry as:

"the employment of any means, other than drugs, medicine, or surgery for the measurement of the powers of vision and the adaptation of lenses for the aid thereof."

The regulation of the practice of optometry is controlled by the Manitoba Optometric Society, which appoints a Board of Examiners for the purpose of conducting the examinations of the Society, and determining the qualifications of applicants for admission. The Society is also responsible for the discipline of members.

Only persons who have a certificate of registration or a certificate of exemption under the Act are entitled to practice optometry. Every person wishing to practice must be more than 18 years of age, be of sound moral character, and have graduated from a College of Optometry maintaining a standard acceptable to the examining board. In addition, the individual must be examined on his/her qualifications for the practice of optometry.

b) Insured Services

The Manitoba Health Services Commission insures services provided by optometrists to include a complete eye examination including refraction and prescription at least once per year.

TABLE I.4.1

TOTAL NUMBER OF OPTOMETRISTS IN MANITOBA, 1970 - 1979

YEAR	MANITOBA OPTOMETRIC SOCIETY	MANITOBA HEALTH SERVICES COMMISSION
1970	53	34
1971	57	42
1972	57	45
1973	57	52
1974	57	54
1975	61	53
1976	64	55
1977	65	57
1978	63	61
1979	69	61

TABLE I.4.2

TOTAL NUMBER OF ACTIVE RESIDENT OPTOMETRISTS

BY AGE AND SEX 1979 - MANITOBA

AGE GROUP	MALE	FEMALE	TOTAL
Less than 20	-	-	-
20 - 24	1	1	2
25 - 29	5	1	6
30 - 34	9	-	9
35 - 39	6	-	6
40 - 44	1	-	1
45 - 49	2	-	2
50 - 54	7	-	7
55 - 59	15	-	15
60 - 64	11	-	11
65 and over	9	-	9
Unknown	1	-	1
Total	67	2	69

Notes: 1) Ages supplied by Manitoba Health Services Commission

In addition however, a complete eye examination is covered at any time if the Commission is supplied with satisfactory evidence that medical reasons require the provision of such services. Furthermore, the initial fitting of contact lenses is insured following congenital cataract surgery.

c) Assumptions

i Stock

. Historical stock 1970 to 1979 - The total number of active optometrists from 1970 to 1979 is shown in Table I.4.1, opposite. The count provided by the Manitoba Optometric Society (MOS) includes all optometrists residing in Manitoba, and holding an active registration. The Manitoba Health Services Commission (MHSC) count includes only optometrists who received more than a specified level of payment from the Manitoba Health Services Commission during a one year period. This difference in definition accounts for the discrepancies in total numbers.

. Current stock 1979 - The most current information regarding the stock of active optometrists in Manitoba is presented in Table I.4.2, opposite. The age and sex distribution of optometrists was derived from the Manitoba Health Services Commission records. The Manitoba Optometric Society reports a total of 68 registered optometrists in 1980.

TABLE I.4.3

FACTORS AFFECTING MANPOWER SUPPLY

OPTOMETRY, MANITOBA

FACTOR	ASSUMPTION	SOURCE
Stock	68	M.H.S.C., M.O.S.
Net migration	1	M.O.S.
Net immigration	1 every 3 years	M.O.S.
Net occupational shifts	0	
Training output	2 per year	School of Optometry, University of Waterloo
Active/inactive	0	M.O.S.
Attrition	1979 age distribution; retirement at both age 60 and 65	

Notes: M.O.S. - Manitoba Optometric Society
M.H.S.C. - Manitoba Health Services Commission

ii Factors Affecting Manpower Supply

Table I.4.3, opposite, shows the assumptions made for each of the factors which have the potential to affect stock. These factors are migration, immigration, occupational shifts, training outputs, active to inactive stock, and attrition.

. Net migration - Data specific to interprovincial migration of optometrists is not available from government sources. However, estimates of net migration have been derived using interview information provided by the Society's President and Registrar. A net migration of one optometrist per year is assumed.

. Net immigration - According to the Society President and Registrar, international migration of optometrists into Manitoba has been limited. A net immigration of one optometrist every three years has been assumed, based on 3 immigrants in the time period 1970-1979. Information obtained from Immigration and Demographic Policy Division, Employment and Immigration Canada indicates that 1 optometrist has moved into Manitoba in the period 1973-1979.

. Net occupational shifts - The four year training program for optometry precludes the upgrading of a related occupational group over a short period of time. The factor is assumed to be zero from 1981 to the year 2000.

. Training output - The Province of Manitoba enters into a contractual agreement with the Province of Ontario and the University of Waterloo to purchase up to three places in the School of Optometry, provided candidates meet the school's qualification standards. To date, only one year's experience is available for graduates. Output from training has been assumed as 1 graduate per year in 1981 and 1982, 2 graduates in 1983, 3 in 1984 and 2 per year for the period 1985 to 2000.

. Active to inactive stock - The President and Registrar of the M.O.S. indicated that there are no inactive optometrists in Manitoba, although a number are only part-time practitioners. The Manitoba Health Services Commission, however, defines "active" by the level of payments received by an optometrist from the plan in a full year period. Optometrists not meeting the minimum payments level of $10,000 are excluded from the Manitoba Health Services Commission defined active stock. Historically, the number of optometrists falling in the part-time category has averaged about 8 per year. (See Table I.4.1, above). (It should be noted that the minimum income level of $10,000 has remained constant since 1970, and no attempt has been made to adjust for the impact of inflation. Thus, the number of individuals earning less than minimum has declined from 36% in 1970 to 5% in 1978).

At the present time female enrolments at the two Canadian Schools of Optometry account for 60% of all students. The future stock of optometrists may be affected by this distribution, if female labour force participation is less than that of males. The M.O.S. President indicated that the two resident female optometrists did not allow reasonable projections to be made. For this reason, and given the limited number, the value for active to inactive flows is assigned to zero during the forecast period.

. Attrition from death and retirement - The figures assumed for this value are based on retirement at age 65, and are derived from the age distribution of active practitioners. The M.O.S. was unable to supply data derived from the survey of retirement intentions conducted by the Canadian Optometric Association.

iii Requirements

. Historical population ratio - The 1979 ratio of optometrists to total population of 1:15,170 was used to determine the required number of optometrists, to maintain the current level of services over the projection period.

TABLE I.4.4

TOTAL NUMBER OF OPTOMETRIC SERVICES, MANITOBA

BY AGE AND SEX OF PATIENT, 1970 to 1979

	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979
Male										
00 - 04	224	256	275	293	326	361	361	407	453	650
05 - 14	5,506	6,203	6,679	7,109	7,566	8,041	8,118	8,477	9,433	10,994
15 - 24	6,544	7,380	7,944	8,456	9,002	9,560	9,584	10,172	10,610	12,356
25 - 34	3,803	4,289	4,607	4,902	5,213	5,865	6,304	7,023	7,861	9,306
35 - 44	2,380	2,682	2,887	3,073	3,271	3,478	3,384	4,117	4,716	5,543
45 - 54	4,841	5,448	5,864	6,239	6,649	7,066	7,092	7,750	7,726	9,000
55 - 64	4,161	4,695	5,058	5,384	5,731	5,865	6,089	6,657	6,941	8,086
65+	4,158	4,682	5,042	5,368	5,710	5,877	6,427	7,153	7,476	8,856
Total	31,617	35,635	38,356	40,824	43,468	46,113	47,809	51,756	55,216	64,891
Female										
00 - 04	255	297	292	310	329	335	350	406	452	686
05 - 14	6,805	7,696	8,232	8,762	9,329	9,854	9,887	10,051	11,396	12,597
15 - 24	9,938	11,242	12,031	12,805	13,630	14,737	15,412	16,097	17,418	19,728
25 - 34	5,528	5,916	6,694	7,125	7,581	8,231	8,852	10,044	11,389	13,919
35 - 44	3,887	4,394	4,704	5,007	5,331	5,632	5,845	6,295	7,202	8,414
45 - 54	6,358	7,170	7,668	8,161	8,704	8,773	8,889	9,197	9,557	10,857
55 - 64	4,931	5,571	5,971	6,355	6,766	7,151	7,424	8,110	8,511	9,941
65+	5,249	6,123	6,514	6,933	7,381	7,674	8,290	8,969	9,701	11,652
Total	42,951	48,409	52,106	55,458	59,051	62,387	64,949	69,169	75,626	87,794
Grand Total	74,568	84,044	90,462	96,282	102,519	108,500	112,758	120,925	130,842	152,685

Source: Manitoba Health Services Commission. Annual Reports 1970 - 1980, August, 1980

TABLE I.4.4 (A)

TREND IN PER CAPITA UTILIZATION

OF OPTOMETRIC SERVICES IN MANITOBA, 1970 to 1979

YEAR	TOTAL SERVICES	POPULATION	SERVICES PER POPULATION (PER CAPITA)
1970	74,568	981.00	0.0760
1971	84,044	988.00	0.0851
1972	90,462	991.50	0.0912
1973	96,282	997.80	0.0965
1974	102,519	1,020.9	0.101
1975	108,500	1,018.3	0.106
1976	112,758	1,021.5	0.109
1977	120,925	1,029.1	0.118
1978	130,482	1,032.9	0.126
1979	152,685	1,046.8	0.146

Source: Manitoba Health Servicess Commission - Annual Reports 1970 to 1980.

TABLE I.4.5

TOTAL NUMBER OF REFRACTIONS

PERFORMED IN MANITOBA, 1970 - 1979

YEAR	OPTOMETRISTS	OPHTHALMOLOGISTS	OTHER PHYSICIANS	TOTAL
1970	74,565	78,700	11,479	164,744
1971	84,002	80,807	17,079	181,888
1972	89,923	77,396	29,334	196,653
1973	95,314	85,224	33,566	214,104
1974	101,157	85,244	29,095	215,466
1975	105,810	84,628	33,675	224,113
1976	108,099	82,147	39,588	229,834
1977	119,351	76,851	38,038	234,240
1978	130,626	68,586	40,894	240,106
1979	152,491	66,201	45,230	263,922

Source: Manitoba Health Services Commission, August 1980

Notes:

1. Report #A44M552 - excludes out of province services provided to Manitoba residents

2. Optometrists services under Tariff 78545 and Tariff 78546
   Ophthalmologists Tariff 78543
   General Practitioners Tariff 78543

3. Other Physicians includes urban and rural G.P.'s

TABLE I.4.6

NET REQUIREMENTS, MANITOBA, OPTOMETRY

(Incremental and Cumulative)

YEAR	Low Population Scenario						Medium Population Scenario						High Population Scenario					
	LOW		MEDIUM		HIGH		LOW		MEDIUM		HIGH		LOW		MEDIUM		HIGH	
	A	A	C	C	B	B	A	A	C	C	B	B	A	A	C	C	B	B
1981	-4	-4	5	5	41	41	-6	-6	6	6	42	42	-6	-6	-6	-6	42	42
1982	3	-1	4	9	4	45	-3	-9	3	9	4	46	-3	-9	4	10	4	46
1983	-1	-2	-1	8	0	45	1	-8	0	9	-1	45	0	-9	-1	9	0	46
1984	-1	-3	-1	7	-1	44	1	-7	-2	7	-1	44	-2	-7	-1	8	-1	45
1985	0	-3	0	7	0	44	0	-7	1	8	1	45	-1	-8	0	8	1	46
1990	0	-3	1	8	2	46	0	-7	0	8	1	46	0	-8	1	9	2	48
1995	-8	-11	-8	0	-7	39	6	-1	-7	1	-5	41	6	-2	-6	3	-5	43
2000	-14	-25	-13	-13	-12	27	-13	-12	-13	-12	-13	28	-12	-10	-13	-10	-12	31

Requirements derived using:

A. Historical approach of 1:15,170 achieved in 1979
B. Utilization approach based on current services. No productivity
C. Service target ratio of 1:10,000

. Utilization - The total number of refractions by patient age and sex from 1973 to 1979 was obtained from the Manitoba Health Services Commission, and is presented in Table I.4.4, opposite. This data excludes refractions performed by ophthalmologists and general practitioners, but includes services provided to Manitoba residents out-of-province.

Table I.4.4 (A) shows the trend in per capita utilization of optometric services in Manitoba from 1970 to 1979.

The proportion of refractions performed by ophthalmologists since 1970 has declined from 47.8% in 1970 to 25.1% in 1979. (See Table I.4.5). Refractions performed by other physicians has increased from 7% in 1970 to 17.1% in 1979.

. Service target ratios - Requirements were projected using a service target ratio of 1:10,000.

d) Requirements

Table I.4.6, opposite, shows the net manpower requirements (incremental and cumulative) for optometry.

. Highlights - Based on the medium population scenario, the requirement for manpower is approximately the same for the historical population and utilization approaches. Under the

TABLE I.4.7

PROJECTED NET MANPOWER REQUIREMENT FOR OPTOMETRISTS

UNDER VARYING DEMAND FOR SERVICE SCENARIOS

PROVINCE: MANITOBA

	Projected Growth In Utilization of Services									
YEAR	1%		1.5%		2.0%		2.5%		3.0%	
	I	C	I	C	I	C	I	C	I	C
1981	7	7	7	7	8	8	9	9	10	10
1982	2	9	4	11	4	12	3	12	4	14
1983	-1	8	-1	10	-1	11	0	12	0	14
1984	-2	6	-3	7	-2	9	-1	11	-1	13
1985	0	6	1	8	1	10	1	12	1	14
1990	6	12	6	14	8	18	10	22	13	27
1995	5	17	9	23	12	30	15	37	19	46
2000	0	17	4	27	7	37	11	48	15	61

Notes: 1) Projected under medium population scenario
2) I = Incremental, C = Cumulative

utilization approach, there is a requirement for 7 additional practitioners from 1981 to 1990, and under the historical population approach, there is a requirement for 8 additional practitioners. In the period 1991 to 2000 there is a surplus of 19 practitioners using the utilization approach, and 20 practitioners using the historical population approach.

Based on the service target approach, there is an immediate requirement for 42 additional practitioners, and an additional 4 from 1981 to 1990. Between 1991 to 2000 there is an approximate surplus of 2 per year.

. Sensitivity Analysis - The above three approaches were tested to determine their sensitivity to the level of training output assumed. No graduates from the University of Waterloo were added to the stock of optometrists after 1989. As a result, the manpower surplus projected became a net requirement for an additional 2 practitioners per year, from 1990 to 2000, under the three approaches.

In addition, manpower requirements were projected under a varying demand for services. Table I.4.7, opposite, shows the projected net manpower requirement and net requirement for an annual increase in service demand of 1%, 1.5%, 2%, 2.5% and 3%, based on medium population projection. Per practitioner rates were based on an annual increase in productivity of 2%.

Based on an annual increase in demand for services of 2%, there is a net requirement for 37 additional practitioners by the year 2000, or approximately 2 additional practitioners per year.

TABLE I.5.1
NET MANPOWER REQUIREMENTS
OPTOMETRY, WESTERN CANADA

ASSUMPTION 1 Uninterrupted Training Output - School of Optometry, University of Waterloo

	Net Manpower Requirement Year 2000	10% Attrition Allowance	Total	Approximate Annual Net Requirement
1) Current population ratio	42	4	46	3
2) Target ratio (1:10,000)	250	25	275	14
3) Service demand (2% increase in services 2% productivity increase)	90	9	99	5
4) Service demand (3% increase in services 2% productivity increase)	269	27	296	15
5) Service demand (2% increase in service, 1% productivity increase)	226	23	249	13
6) Service demand (3% increase in services, 1% productivity increase)	437	44	481	24
ASSUMPTION 2 Interrupted Training Output - School of Optometry, University of Waterloo				
1) Current population ratio	141	14	155	8
2) Target ratio (1:10,000)	349	35	384	20
3) Service demand (2% increase in services 2% productivity increase)	189	19	208	11
4) Service demand (3% increase in services 2% productivity increase)	368	37	405	21
5) Service demand (2% increase in services, 1% productivity increase)	325	33	358	18
6) Service demand (3% increase in services, 1% productivity increase)	536	54	590	30

4. TRAINING RECOMMENDATIONS

4.1 Introduction

In this section of the report, we review various training location and funding arrangement alternatives for optometrists in Western Canada. The alternatives are evaluated using the decision process outlined in Section 1, above.

4.2 Step 1. Analysis of Net Manpower Requirements

Table I.5.1, opposite, shows the net manpower requirements for optometry in Western Canada, under two differing assumptions. These assumptions are:

- that contracted training places at the School of Optometry, University of Waterloo continue at current output levels throughout the forecast period.

- that contracted training places are terminated at the conclusion of the current training agreement, after the student intake in 1984-1985.

Within each assumption, the results of six alternative projection approaches are shown. A 10% attrition allowance has been added to the total manpower requirement, in order to compensate for potential attrition of new practitioners who have entered the workforce within the forecast period. The scenario of a 2% annual increase in service demand, and a 2% increase in practitioner productivity, indicates a net requirement for 5 additional practitioners per year from 1981

to 2000. It should be noted, however, that the major retirement for 117 additional practitioners occurs before 1990. This reflects the immediate need to replace retiring practitioners. Because of the immediacy of the manpower requirement, it is debatable whether additional training programs are the most effective response to the projected shortage in the 1980's. This is further emphasized by the forecasted surplus manpower situation after 1990.

4.3 Step 2. Analysis of Appropriate Types of Training

There is currently no inactive workforce in optometry with the potential to return to the active workforce, therefore, refresher training is not indicated. Furthermore, there is no career ladder progression from a sub-occupation to optometry, and thus, upgrading is not indicated. The net manpower requirement cannot be satisfied from these two types of training. The only viable form of training is to consider introductory skills training.

4.4 Step 3. Definition of Alternative Training Locations

No training program for optometry exists in Western Canada. The only English speaking program is at the School of Optometry, University of Waterloo. Entrance to the optometry program is subject to the standards set by the school.

Although Western Canada can theoretically reserve 13 places in the optometry program, output has been projected at only 9 students per year in those provinces. If the three governments can ensure a constant student input of 13 per year, this would

reduce the net requirement to 1 additional practitioner per year, under the 2% increase in services utilization offset by a 2% increase in productivity.

No formal discussion has taken place between the study team, the School of Optometry and the Government of Ontario on the potential to expand the optometry program at the University of Waterloo. The dean of the school indicated that the current enrolment level is optimal both in terms of the physical facililties, and the current clinic facilities.

The alternative to increasing the number of entrants at the School of Optometry, University of Waterloo, is to set up bursary programs for Western Canadian students to attend Schools of Optometry in the United States. Again, no discussions have been held to evaluate whether such bursary programs would be feasible.

4.5 Summary of Training Alternatives

The requirement for 5 more practitioners per year, could be satisfied by increasing the number of entrants to the School of Optometry, University of Waterloo and by granting or increasing bursaries for optometry programs in the United States. However, this strategy will not resolve the immediate net manpower requirement attributable to the high retirement rate in the next decade.

4.6 Alternative Manpower Strategies

In Section 3.1.5, above we commented on the potential impact of

increasing the migration of established optometrists into Western Canada. Under current conditions, we do not believe that the rate of migration is likely to increase. We recommend, however, that representatives of the four Western Provinces consider actively recruiting, and where appropriate, providing financial incentives to assist in setting up practices. This course of action may provide sufficient incentives to attract additional practitioners to help resolve the immediate manpower requirement.

4.7 Training Solutions To The Alternative Manpower Requirements- A Western School of Optometry

The minimum size for a university-based School of Optometry is considered to be 20 entrants per year.[16] It is estimated that Governments of Alberta, Saskatchewan, and Manitoba, currently graduate 9 per year, and can place up to a maximum of 13 entrants per year in this program. The potential demand for a School of Optometry in Western Canada is dependent on the additional long-term demand for optometrists. This additional demand will be determined by:

- the long-term increase in the need for services
- female labour force participation rates
- the potential to increase productivity
- the role and scope of practice of optometry, and the inter-relationship with ophthalmologists

16. Conversation with Woodruff, Dr. M.E., Dean, School of Optometry, University of Waterloo.

The justification for a Western School of Optometry has been supported by various interest groups, based on the need to replace the large number of retiring practitioners in Western Canada. As indicated, the majority of retirements will occur in the next decade. The establishment of a Western School of Optometry will do little to relieve the immediate manpower requirement in the 1980's, since new graduates from such a program would nothave a significant impact before 1990. This assumes that a minimum of two years would be needed to set up the program, that four years would elapse before graduates would emerge and that two to three years are needed to set up and develop a practice.

The real justification for a School of Optometry in Western Canada is based on the long-term requirement for optometrists in the 1990's. The applicability, or appropriateness of any one of the 12 scenarios discussed in this report is dependent of the health care strategy for the provision of vision care services, adopted by each province. The most likely vision care strategy will determine the manpower requirements, and therefore the indicated training response.

Under the most likely scenario, and assuming continued training output from the School of Optometry, University of Waterloo, there is the potential for a limited surplus of optometrists in Western Canada after 1990. The need for a School of Optometry in Western Canada has not, at this time, been justified.

APPENDIX A

SCOPE AND CONTROL OF PRACTICE

OPTOMETRISTS: CONTROL OF PRACTICE

PROVINCE	CERTIFICATION/LICENSING/REGISTRATION			TRAINING PROGRAM/ACCREDIATION		
	Required Characteristics of Applicants	Certification Requirements	Licensing Requirements	Length of Training & Admission Requirements	Training Location	Educational Accreditation
SASKATCHEWAN	. 18 years old . Proof of moral character, and age	. Evidence of academic standing on the matriculation examination required by the University of Saskatchewan . Diploma from a college or school of optometry recognized by the University of Saskatchewan	. Must have practised six months as an optometrist under the supervision of a practising optometrist . Pass examination approved by the University of Saskatchewan . Pay prescribed fees . Obtain and display annual license	. Two years university training in specific science subjects . Four year professional programme	. No schools or colleges of Optometry in Saskatchewan . Training is provided by the School of Optometry at the University of Waterloo, and Saskatchewan reserves three places	. Any school or college of Optometry recognized by the University of Saskatchewan (on recommendation by the Saskatchewan Optometric Association)
MANITOBA	. 18 years old . Good moral character	. Graduate from a college of Optometry maintaining a standard satisfactory to the Board of Examiners	. Pass examination by the Board of Examiners . Register with the Manitoba Optometric Society council . Submit personal photograph to association . Obtain and display certificate of registration . Pay annual dues of society and obtain renewal of registration	. Two years university training in specific science subjects . Four year professional programme	. No schools or colleges of Optometry in Manitoba . Training is provided by the School of Optometry at the University of Waterloo, and Manitoba reserves three places	. Any school or college of Optometry approved by the Board of Examiners

PROVINCE	CERTIFICATION/LICENSING/REGISTRATION			TRAINING PROGRAM/ACCREDIATION		
	Required Characteristics of Applicants	Certification Requirements	Licensing Requirements	Length of Training & Admission Requirements	Training Location	Educational Accreditation
BRITISH COLUMBIA	. 19 years old . Birth certificate required . Entitled to be registered as a voter under the Election Act . A British subject	. Registration with board prior to April 11, 1946 . Graduate of a course in a school of Optometry . Practiced optometry continually for five years in another location	. Submit personal photograph, and application verified by affidavit . Provides board with required documents and evidence . Passes board examination . Pays prescribed fees . Registers with board . Obtains and displays certification of registration . Annual registration and license fee	. Minimum equivalence of a university entrance in British Columbia . 4 year professional program	. No schools of optometry in British Columbia . Only accredited Canadian school of optometry is the University of Waterloo.	. Any course of training and education in the study of optometry approved by the board of examiners, elected by members of the British Columbia Optometric Association
Alberta	. 18 years old . Good moral character . Proof of good standing with optometrical associations in Canada or elsewhere.	. Graduate from a training program approved by the Board of Examiners for Optometry.	. Apply for license with Board of Examiners for Optometry. . Pass board examinations . Obtain and display certificate of registration . Annual registration with Alberta Optometric Association	. Two years university training in specific science courses . 4 year professional program . Subsequent to five years after graduation must complete at least 12 hours postgraduate study in Optometry every year	. No schools of optometry in Alberta . Only accredited Canadian School of Optometry at University of Waterloo, from which Alberta gets 7 places	. Any training program approved by the Board of Examiners for Optometry . Postgraduate courses from Canadian Association of Optometry, any provincial optometric association, U.S. or state optometric associations

(continued)

APPENDIX B

OCCUPATION BIBLIOGRAPHY

BIBLIOGRAPHY ON OPTOMETRY AND OPHTHALMIC DISPENSING

JOURNAL ARTICLES

"An Eye-Care Crisis with No End in Sight." McLean's, May, 1980.

Birchard, Clifton and Theodore Elliot. "A Re-evaluation of the Ratio of Optometrists to Population in the United States in light of Socio-economic trends in Health Care." American Journal of Optometry, 1967.

DeMairs, A. "Ophthalmic Technician Research Relevant to the Elderly Patient," Center for Gerontological Studies, July, 1980.

Fisker, E.J. "Optometrical Education in Canada." University of Waterloo.

Griffith, F.H. "The Use of Auxilliaries in Optometric Practice," The Canadian Journal of Optometry, June, 1980.

Marg E. and Ng R. "Optometrists Human and Computer Assistants," Journal of Occupational Medicine, May 1, 1972.

Mohr, C.S. "The Technician in Optometric Practice," Journal of American Optometric Association, January, 1977.

Myers, Raymond. "Optometric Manpower: An Analysis of Supply" Journal of the American Optometric Association, November, 1971.

"Optical Dispensing Problems Do Exist." Letter to the editor from the Chairman of public relations and manpower, the Ophthalmological Society of Alberta, Edmonton Journal, July 25, 1980.

Pitts, Donald G. "Workshop Committee Report on Minimum Adequate Examination, USAF Digest, September, 1969.

Schaefer, D. "Canadian Optometric Trust Fund," Canadian Journal of Optometry, Various Issues 1979 - 1980.

Schmidt, B.T. "Vision Care Services in British Columbia, Unpublished paper, 1980.

Schmidt, B.T., and M.J. Samet. "General Practice Patterns and Workload Distribution B.C. Optometrists Core Group," The Canadian Journal of Optometry, June, 1980.

Skuza, Burton H. "Health Planning and Resources Development: An Opportunity for Optometry," Journal of the American Optometric Association, February, 1976.

Soroka, Mort. "The Supply of Optometric Manpower," Journal of the American Optometric Association, 1977.

"The Eye-Glass Wars." Alberta Report, June, 1980.

"The Role of the Optometrist in Health Care Delivery." Canadian Journal of Public Health, March/April, 1975.

Woodruff, M.E. "A Comparison of Two Automated Refractors with Retinoscopic Findings in a School Screening Program," Canadian Journal of Optometry, December, 1979.

Woodruff, M.E. "Optometry an Under Utilizied Source of Assistance to the Primary Care Physician," Canadian Journal of Public Health, 1978.

Woodruff, M.E. "The Pros and Cons of Optometry in an Academic Health Center," Canadian Journal of Optometry, Autumn, 1975.

Worthen, D.M. "The Ophthalmological Optometric Interface," Symposium Legislation and the Role of the Para-professional in Eye Care, 1976.

Worthen, D.M. "The Present Scene - What can be learned from the visual care system of the British National Health Service?" Survey of Ophthalmology, July - August, 1977.

Worrell, B. "Some Approaches to the Maldistribution of Optometric Manpower" Journal of the American Optometric Association, November, 1971.

REPORTS

Aziz, J. Supply projections to 1981: Optometrists, Health and Welfare Canada, 1974.

A Proposal for Career - Ladder Training of Ocular Allied Health Personnel, American Optometric Association.

Blair, W.R.N. Report on Optometry, University of Calgary, 1976.

Bureau of Health Manpower, U.S. Department of Health Education and Welfare, 1976, Optometric Manpower Resources.

Bureau of Health Manpower, United States Department of Health, Education and Welfare, 1976. The Study of Optometrists in the United States: Current and Future.

Coates, D. Studies in the Economics of the Profession of Optometry, Phd. dissertation, The City University of New York.

Colarado Commission on Higher Education, 1978. Report to the Legislation on the Need For Optometrists.

Haffner, A. A National Study on Assisting Manpower in Optometry. Optometric Center of New York, 1971.

Health and Welfare Canada, 1977. Visision Canada.

Ministry of Health, British Columbia, 1977. Report of the Vision Care Task Force.

National Commission on Accrediatation, 1973. Report of the National Study of Optometric Education.

New England Board of Higher Education, Recommendation for Regional Action for Optometric Education in New England, 1975.

Redmond, Douglas. Analysis of Data on Optometric Students, American Optometric Association, 1976.

Redmond, D.W. Concept Development for an Information Retrieval System for Optometry and Related Manpower, American Optometric Manpower, 1972.

Report to the Multi-disciplinary Health and Planning Group of the John Hopkins University to the Maryland Comprehensive Health Planning Agency, June, 1974.

Report of the Vision Care Task Force. Ministry of Health, British Columbia, 1977.

Report of the National Study of Optometric Education. National Commission on Accrediatation, 1973.

Report of the Senate Committee, University of Waterloo, on Optometric Education in the University, 1967.

Saskatchewan Department of Continuing Education. A Review of Current Developments Having Implications for Manpower Supply in the Eye Care Field, March, 1974.

Senate Planning Committee. Proposal for a School of Optometry at the University of Victoria, 1977.

Shillington, E.R., and D.O. Anderson. Visual Care Needs and Manpower in British Columbia, Health Manpower Research Unit, U.B.C., 1974.

Task Force on Eye Care. A Report to the Nova Scotia Council of Health, 1972.

The Demand for and Supply of Professional Refractive Eye Care Services in Alabama and Surrounding States.

Vision Service Delivery in Ontario with Recommendations for Meeting the Unmet Needs for Vision Care and Rationalization of the Delivery of Vision Care Services, 1977.

BRIEFS

Alberta Optometric Association. People of Vision are Needed Here and Now, A Brife to the Legislative Assembly.

Alberta Optometric Association. The Need for the Creation of a School of Optometry in Alberta, 1978.

Canadian Association of Optometrists. A Brief Concerning A School of Optometry in a University in Western Canada, 1970.

Canadian Association of Optometrists. Presentation to Health Sciences Review, 1979.

Canadian Association of Optometrists. Submission to the House of Commons Special Committee on the Disabled and the Handicapped related to the Unmet Needs of the Visually Handicapped, September 1, 1980.

Canadian Association of Optometrists. The Role of the Optometrist in Health Care Delivery; A Guideline for Manpower Planning in the Vision and Eye Care Field, 1974.

Canadian Association of Optometrists. The Western School of Optometry Proposal: Health Manpower Implication, Conference on Optometric Education, 1973.

Canadian Association of Optometrists. Vision Care Needs and Optometric Manpower Requirements in Western Canada, In Reference to the Need for a School of Optometry to be Established in Western Canada, 1973.

Canadian Medical Association. Policies of the Canadian Ophthalmological Society on Eye and Vision Care in Canada, 1975.

Schaefer, D.N. An Annual Synopis of Activity 1970 - 1980 for the New Academic Facilities Committee of the Canadian Association of Optometrists, August 15, 1980.

School of Optometry, University of Waterloo. A Brief respecting changes in Optometric Education 1962 to 1980, Health Sciences Review, 1979.

School of Optometry, University of Waterloo. Discussion and Recommendations in Response to the Ontario Task Force Report on Health Research Requirements, 1977.

Walsh, G. The Economics of Vision Care. Canadian Association of Optometrists, for the Conference on Optometric Education, 1973.

EDUCATIONAL MATERIAL

1) Council on Optometric Education, American Optometric Association. Manual of Evaluation Procedures.

2) Council on Optometric Education American Optometric Association Manual of Evaluation Requirements and Guidelines: Professional Optometric Degree Programs.

3) University of Waterloo. Annual Calendar 1980 - 1981.

4) University of Waterloo. General Survey Correspondence 1980.

Province of
British Columbia

Province of
Alberta

Province of
Saskatchewan

Province of
Manitoba

WESTERN CANADA
HEALTH MANPOWER TRAINING STUDY

Section III - Category # 1 - Report II

CHIROPRACTIC

REPORT II

CHIROPRACTIC: THE REQUIREMENT FOR ALTERNATIVE TRAINING AND FUNDING ARRANGEMENTS IN WESTERN CANADA

TABLE OF CONTENTS (Continued) PAGE

PROVINCIAL ASSUMPTIONS (Continued)

. SASKATCHEWAN

- Legal Controls 24
- Insured Services 24
- Assumptions 24
  - Stock 24
  - Factors Affecting Manpower Supply 25
  - Requirements 27

Net Requirements 28

. MANITOBA

- Legal Controls 30
- Insured Services 30
- Assumptions 31
  - Stock 31
  - Factors Affecting Manpower Supply 31
  - Requirements 33

Net Requirements 34

4. TRAINING RECOMMENDATIONS 35

Appendix A - Scope And Control of Practice

Appendix B - Occupation Bibliography

STUDY BACKGROUND, OBJECTIVES AND APPROACH

STUDY BACKGROUND - GENERAL INTRODUCTION

The provision of effective health services to the community is, to a considerable degree, dependent on three essential resources:

- an adequate supply of well trained specialist staff in each health occupation group
- the development of adequate facilities to service the community
- the availability of adequate funds to ensure cost effective and efficient health services.

The range and complexity of health treatment programs has expanded greatly in Canada during the last twenty five years. In addition, changing technology and the development of new treatment programs have resulted in an increased requirement for skilled, adequately trained health manpower. These factors have resulted in an increased emphasis on manpower planning and skill training for health occupations to ensure an adequate supply of trained practitioners to meet defined manpower requirements.

STUDY ORIGINS

The Western Canada Health Manpower Training Study was initiated by the Western Premiers at their annual conference in 1980. The study is under the direction of a Steering Committee comprised of government representatives from the Provinces of British Columbia, Alberta, Saskatchewan and Manitoba. The members of the Steering Committee represent both the Health and Education departments within each provincial government.

STUDY OBJECTIVES

The study terms of reference contain two major objectives. These are:

- to assess the existing and future needs for health manpower training programs and facilities in Western Canada
- to make recommendations for the rationalization of the location and funding of health manpower training programs and facilities in Western Canada.

STUDY TIMING

The study consists of a review of 26 health occupations to be examined in five categories. The initial category consists of five occupations, selected for the study on the basis of current availability of training programs in Western Canada. Although the study is divided into five categories for review, each occupation within these is to be studied independently over the next two years. Several of the occupations are inter-related. The requirement for one kind of manpower may be influenced by that of another, yet the two occupations may not be reviewed at the same time. Therefore, the study recommendations should be reviewed once all the occupations have been studied.

STUDY APPROACH

Introduction

In order to achieve the study objectives, the work program consists of three key activities. These are:

- the analysis of manpower supply and requirements, and the calculation of net manpower requirements
- the analysis of existing training programs for Western Canada
- the development of recommendations for alternative training locations and funding arrangements

Analysis of Manpower Supply and Requirements

The analysis of manpower supply and requirements is designed to allow for a variety of data inputs, and for different emphasis depending on the occupation under review. A variety of data sources are used including provincial and national associations, health insurance agencies, and provincial health and education departments. In all instances, data is developed independently of previously published sources.

In addition to the basic projection of net manpower requirements, a number of sensitivity analyses have been completed to assess the impact of changes in the factors affecting supply and requirements, prior to developing recommendations for either additional training programs, or expanding existing training programs.

Approaches to Determining Manpower Requirements

The approach developed to determine manpower requirements uses three methods of projection. These are discussed below.

1. Service Utilization Approach

The utilization approach is based on an analysis of the pattern of health service usage. It establishes trends in service utilization and projects these onto future population estimates. There are three steps in the service utilization approach.

Step 1 - Determine Per Capita Utilization Rate

Historical data of the number of services provided, by age and sex of recipient is derived. The number of services per age/sex group is then divided by the population for that group in the corresponding year. This results in a per capita utilization rate.

Step 2 - Project Future Service Required

The per capita utilization rate is projected onto the low, medium and high population for each year from 1981 to 2000. This results in an estimate of total future services.

Step 3 - Estimated Number of Practitioners Required

Having determined the total future services, the model projects the number of practitioners required, by assuming a constant level of services per practitioner. The number of services per

practitioner is determined by dividing total services by the number of practitioners in the base year. To estimate the required number of practitioners, the model divides total future services required by the number of services per practitioner.

2. Service Target Ratio Approach

Service target ratios reflect a theoretical optimal manpower level required to meet health service requirements in the occupation under review. They are expressed as the ratio of practitioner to population. The service target ratios are derived based on discussion with health authorities, review of published reports, articles and summary of defined health care needs.

3. Population Ratio Approach

Population ratios are derived by dividing the total population at a specified point in time by the number of active practitioners. This results in a ratio of practitioners to population.

These ratios are analysed to determine if any trends exists. To project future manpower requirements, the model divides total projected population by the previously determined population ratio.

EXAMPLE 1

TABLE

NET REQUIREMENTS

(Incremental and Cumulative)

YEAR	Low Population Scenario						Medium Population Scenario						High Population Scenario					
	LOW		MEDIUM		HIGH		LOW		MEDIUM		HIGH		LOW		MEDIUM		HIGH	
	B	B	A	A	C	C	B	B	A	A	C	C	B	B	A	A	C	C
1981	1	1	1	1	6	6	1	1	1	1	7	7	4	4	4	4	10	10
1982	-1	0	-1	0	-1	5	-1	0	-1	0	-1	6	-1	3	0	4	0	10
1983	-2	-2	-2	-2	-2	3	-1	-1	-1	-1	-1	5	-1	2	-2	2	-1	9
1984	-3	-5	-4	-6	-3	0	-3	-4	-3	-4	-3	2	-2	0	-2	0	-2	7
1985	8	3	8	2	8	8	9	5	8	4	9	11	9	9	9	9	9	16
1990	0	3	0	2	0	8	2	7	3	7	3	14	6	15	7	16	7	23
1995	-12	-9	-12	-10	-12	-4	-8	-1	-9	-2	-9	5	-4	11	-5	11	-4	19
2000	-10	-19	-11	-21	-10	-14	-6	-7	-7	-9	-7	-2	-2	9	-2	9	-2	17

Requirements derived using:

A. Historical ratio approach of 1:10,621 achieved in 1976
B. Utilization approach using curent services. No productivity
C. Service target ratio approach of 1:10,000

Summary of Approaches to Projecting Manpower Requirements

The three approaches outlined above have been used for the calculation of manpower requirements for this occupation. The specific application of each approach to this occupation is discussed under Requirements (Section 3.1.3 below).

Presentation of Provincial Net Manpower Requirements

At the conclusion of each provincial section of this report, Section (d) summarizes net manpower requirements, and shows both the incremental and cumulative requirement for each approach within three population scenarios. Example 1, opposite, shows a typical net requirement table.

The table is divided into three sections, low, medium, and high population scenarios. Within each section, low, medium, and high manpower requirement estimates are shown. The manpower requirement approach used to derive these is identified by a letter (A,B,C), which refers to the footnotes. Within each approach, two set of figures are shown for each time point. The left hand column shows the incremental net requirement, and the right hand column shows the cumulative net requirement.

Analysis of Existing Training Programs in Western Canada

This initial study category is composed of occupations for which there are currently no training programs in Western Canada. As part of this initial study we have, however, developed a basic approach for analysing existing training programs for subsequent occupation categories.

Development of Recommendations for Alternative Training Locations and Funding Arrangements

We have developed a decision process to assist in developing recommendations for alternative training location(s) and funding arrangements. This process is designed to allow for the logical, consistent evaluation of a range of training alternatives.

There are seven steps in the decision process:

- Step 1. Analysis of manpower requirements
- Step 2. Identification of the appropriate type(s) of training
- Step 3. Definition of alternative training locations
- Step 4. Evaluation of alternative locations for new programs
- Step 5. Establishment of timing of training program requirement
- Step 6. Recommendation on training action(s) and location(s)
- Step 7. Recommendation on funding alternative(s)

Recommendations for future training location and funding arrangements specific to this occupation are discussed in Section 4, below.

EXHIBIT 1
NET MANPOWER REQUIREMENTS - CHIROPRACTIC
WESTERN CANADA REGION - 1981 to 2000

MEDIUM POPULATION PROJECTION

YEAR/APPROACH	POPULATION RATIO		TARGET RATIO		UTILIZATION	
	INCREMENTAL	CUMULATIVE	INCREMENTAL	CUMULATIVE	INCREMENTAL	CUMULATIVE
1981	-14	-14	2	2	-7	-7
1982	-13	-27	-13	-11	-11	-18
1983	-9	-36	-12	-23	-9	-27
1984	-16	-52	-17	-40	-14	-41
1985	-13	-65	-14	-54	-11	-52
1990	-61	-126	-67	-121	-53	-105
1995	-64	-190	-69	-190	-52	-157
2000	-57	-247	-62	-252	-35	-192

1. SUMMARY AND RECOMMENDATIONS

1.1 INTRODUCTION

This report addresses the projected net requirement for chiropractors in the Provinces of British Columbia, Alberta, Saskatchewan and Manitoba for the period 1981 to 2000.

The study process begins with an assessment of the current stock of chiropractors in each province, and of the factors likely to influence this stock in the future. The net requirement for chiropractic manpower over the projection period is obtained from a comparison of projected manpower supply and requirements.

For each province and the Western Region, the projected future net requirements for chiropractic are subjected to a sensitivity analysis in order to determine the importance of underlying assumptions to the net result. The last step of the study process, is to determine the requirement for alternative locations and funding arrangements for the training of chiropractors in Western Canada. The recommendations concerning training are summarized below.

1.2 WESTERN CANADA OVERVIEW

Exhibit 1, opposite, shows the manpower requirements for

chiropractic for Western Canada. The requirements have been derived using the medium population projection, and represent three alternative scenarios. These are net manpower requirements based on:

1. the current population ratio

2. the target ratio of 1 practitioner for 10,000 population

3. the current level of service utilization with no increase in productivity

In each of the above, net manpower requirements were derived for each province, and these have been combined to determine the net requirements for Western Canada.

Highlights

Although the demand for chiropractic service has increased in the last ten years, the supply of practitioners has matched this increase. Throughout the forecast period (1981-2000), there is an indicated surplus of chiropractors in Western Canada. The population ratio approach, and the target ratio approach indicate a surplus of 247 and 252 in the year 2000. The utilization approach indicates a surplus of 192 chiropractors by the year 2000. Thus, there is a potential surplus of approximately 10 to 13 practitioners per year throughout the projection period. In addition, the indication from Ontario and the United States (potential sources of chiropractors for Western Canada), is that the supply of chiropractors will exceed their requirements during this period.

1.3 MANPOWER TRAINING RECOMMENDATIONS

- That no training program in chiropractic be established in Western Canada.

2. DISCUSSION OF THE OCCUPATION - CHIROPRACTORS

2.1 DEFINITION OF CHIROPRACTIC

A chiropractor is defined as an individual who: "Adjusts spinal column and other articulations to treat dis-orders of human body believed to be caused by interference with nervous system. Examines, question and observe patient to diagnose extent of illness or disorder. Perform or order electrocardiograms, x-rays, spinal analysis and other medical tests to aid in diagnosis. Adjust position of displaced vertebrae and other articulations, using manipulative therapy. Treat patient with heat, light, electric and water therapy or direct other workers to administer treatments. Prescribed corrective exercises, diet and other programs."[1]

2.2 ROLE

2.2.1 Historical Evolution

Practitioners of chiropractic claim that practice of manipulative therapy is based on many historical precedents. In literature on chiropractic theory, examples are widely quoted of previous civilizations where manipulation was extensively practiced to relieve pain and suffering. This historical thread is traced from early Greek civilization through to the 19th century bonesetters.

The father of modern chiropractic was Daniel David Palmer, who practiced manipulation as a healing force. Chiropractic historians consider that the founding of the discipline was in 1895, when Palmer claimed to have cured a patient of deafness by manipulation. Shortly after,

1. Canadian Classification and Dictionary of Occupation, 1971 No. 31157

in 1903, Palmer set up a Chiropractic College. In the early years of the 20th century, Palmer's methods and philosophy of healing spread. In those early days, there was much open hostility between chiropractors and other medical practitioners. To a degree, this was founded on some of the excessive claims for chiropractic manipulation as a healing agent. The controversy around chiropractic has continued within the medical community for the last 50 years.

Chiropractic has been practiced in Canada since approximately 1908. In 1913, the Canadian Chiropractic College was established in Hamilton, Ontario.

2.2.2 Function

Within the broad discipline of chiropractic healing, there is a range of views on the effects of manipulation. The central theme is that spinal "adjustments" can generally improve a patient's health. This is summarized in the following quotation from the Palmer College of Chiropractic Bulletin, 1978-79:

"Chiropractic is that science and art which utilizes the inherent recuperative powers of the body, and deals with the relationship between the nervous system and the spinal column, including its immediate articulations and the role of this relationship in the restoration and maintenance of health."

The function of manipulative therapy is expanded in the brief of the New Zealand Chiropractic Association to the Commission of Inquiry, New Zealand.

"The practice of chiropractic has as its central therapeutic goal the restoration of normal function to the neuromusculoskeletal structures of the spine in order to advance the general welfare of the patient. The modern

theory of chiropractic is no longer simple and direct nerve pressure, but is as complicated as the nervous system itself. Chiropractors do not contend that sublaxation, however defined, is the most significant causal factor in disease. They do claim (however), that sublaxations of different orders and types are a factor in the production of symptoms, and that adjustment of these sublaxations brings about a return to more normal physiological functioning."

2.2.3 Contribution To Continuum of Health Care Delivery

The practice of chiropractic in Canada is under the direct regulatory control of provincial legislation. The various provincial licensing boards are responsible for maintaining standards of practice. Within the context of Workman's Compensation programs, and the Provincial Health Insurance programs, chiropractors provide an alternative to the other forms of medical treatment. The basic area of practice is in the treatment of back pain and related spinal problems. Chiropractic practitioners do not see themselves as an intrinsic component in the medical model, but as a viable alternative for certain categories of health problems.

2.2.4 Legislation

Chiropractors are licensed to practice in every province in Canada, with the exception of Newfoundland. Most medical benefit schemes in Canada include chiropractic services, and Workman's Compensation schemes cover benefits in the majority of provinces, including British Columbia, Alberta, Saskatchewan, Manitoba, New Brunswick, Nova Scotia, Prince Edward Island and Ontario. Specific discussion of the relevant provincial legislation is contained in Section 3.2 below.

2.2.5 Insurability Of Services

Within certain limits, chiropractic services are insured in each of the four Western Provinces. For details see Section 3.2 below.

2.2.6 Education

At present the Canadian Memorial Chiropractic College is the only Canadian institution offering formal education in chiropractic. The successful completion of the basic 4 year program leads to the qualification of Doctor of Chiropractic (D.C.). The total program enrolment is 600, or 150 students in each year. Historically, output has been 85% of total enrolments.

The Canadian Memorial Chiropractic College is an affiliate member of the Council of Chiropractic Education (U.S.A.) which is the official accrediting agency of the United States Office of Education. In 1978, the Council of Chiropractic Education (Canada) was created. At this time, the College is completing the accreditation process under a reciprocal agreement between the United States and the Canadian Council. Doctor of Chiropractic degrees are awarded from United States colleges. As of September 1st, 1978 there were 9 colleges recognized by the Commission on Accreditation of the Council for Chiropractic Education.

The minimum requirement for admission to the College is two years of university or its equivalent, with an academic standing of at least "C" in the required subjects of Biology, General Chemistry (Inorganic), Psychology, and Organic Chemistry.

It is a basic intention of the College to seek univeristy program status, by amalgamating with an existing university. This is currently under review.

TABLE II.0.1

TOTAL NUMBER OF CHIROPRACTORS

IN WESTERN CANADA, 1970 to 1979

YEAR	BRITISH COLUMBIA[1]	ALBERTA[2]	SASKATCHEWAN[3]	MANITOBA[4]
1970	168	-	-	43
1971	159	-	-	46
1972	159	-	-	44
1973	182	195	38	43
1974	198	214	47	45
1975	215	231	48	49
1976	216	243	49	52
1977	232	249	57	60
1978	239	257	58	61
1979	256	258	61	64

Notes: 1. British Columbia Chiropractic Association

2. Alberta Chiropractic Association

3. Saskatchewan Medical Care Insurance Commission

4. Manitoba Health Services Commission

TABLE II.0.2

FACTORS AFFECTING MANPOWER SUPPLY

OF CHIROPRACTIC, WESTERN CANADA

FACTOR	BRITISH COLUMBIA	ALBERTA	SASKATCHEWAN	MANITOBA
Opening stock	270	259	76	64
Net migration	12	12	5 every first year 6 every second year	4
Net immigration	3	2	0	1 every 2nd year
Net occupational shifts	0	0	0	0
Training output	0	0	0	0
Active to inactive flows	0	0	0	0
Attrition	1980 age distribution retirement at 65	1980 age distribution retirement at 65	1979 age distribution retirement at 65	1980 age distribution retirement at 65

3. NET MANPOWER REQUIREMENTS

3.1 GENERAL ASSUMPTIONS

3.1.1 Manpower Stock

The total number of chiropractors in Western Canada from 1970 to 1979 is shown in Table II.0.1, opposite. Currently, there are approximately 640 chiropractors in Western Canada.

3.1.2 Factors Affecting Manpower Stock Supply

Table II.0.2, opposite, shows the assumptions made with respect to each of the factors which have the potential to affect stock, that is migration, immigration, occupational shifts, training output, active to inactive movements, and attrition. A discussion of each of these factors follows.

- Net Migration

  Net migration into each of the Western provinces is positive for each year in the projection period 1981 to 2000. We estimated that there will be a net increase of approximately 33 individuals per year from migration. The migration factor represents graduates from the Canadian Memorial Chiropractic College.

  Net Immigration

- British Columbia, Manitoba and Alberta show positive immigration while in Saskatchewan it is zero.

- Net Occupational Shift

Given the requirement for a 4 year training program, we have assumed that occupation shift is an insignificant factor in the supply of chiropractors.

- Active to Inactive

We have determined that at present, there are no inactive chiropractors in the Western Region. We have concluded that active to inactive is not an important factor in determining chiropractic manpower supply.

- Attrition

Chiropractors in Western Canada are relatively young, with approximately two thirds under 45 years of age. We anticipate 240 retirements in the period under projection. We have not estimated attrition through death because of the small size of the stock, and the joint probability of death and retirement.

3.1.3. Requirements

- Historical Ratios

The current ratio, and the ratio closest to the service target ratio in each province were used to project requirements.

- Utilization Data

  The insured services were used to project utilization. Details are provided in the provincial assumptions.

- Service Target Ratios

  No official service targets have been developed in Canada. Manpower requirements based on a ratio of 1:10,000 were projected, following the target indicated by the American Chiropractic Association.

3.1.4 Productivity

Because of the mix of practice patterns, and the nature of chiropractic services, no changes in productivity have been assumed.

3.1.5 Sensitivity Analysis

Because of the indicated magnitude of the surplus of practitioners in this occupation, we did not use the sensitivity analysis approach.

3.2 PROVINCIAL PARAMETERS

3.2.1 BRITISH COLUMBIA

a) Legal Controls - The Chiropractors Act of British Columbia defines chiropractic as:

"the science of palpating and adjusting the articulations of the human spinal column by hand only, and includes the manipulation and adjustment by hand of the ribs and their articulations for the purpose of adjusting the articulations of the human spinal column."

The act permits chiropractors to use x-ray shadow photographs of the human spinal column, but specifically prohibits the use of drugs or the use of methods other than chiropractic.

Only persons who hold a certificate of registration issued by the Board of Examiners established under the Act are authorized to practice chiropractic in British Columbia. To qualify as a chiropractor, the applicant must have completed the first year of a recognized Canadian university or equivalent, graduated from a recognized school and passed examinations set by the Board.

b) Insured Services

The Medical Services Plan of British Columbia covers chiropractic services other than x-rays. Limits are placed on the payments per year under the plan. The tariff schedule distinguishes between initial and subsequent treatments.

TABLE II.1.1

TOTAL NUMBER OF CHIROPRACTORS

IN BRITISH COLUMBIA, 1970 to 1979

YEAR	MEDICAL SERVICE PLAN	HEALTH MANPOWER RESEARCH UNIT	BRITISH COLUMBIA CHIROPRACTIC ASSOCIATION
1970	-	-	168
1971	-	-	159
1972	-	-	159
1973	-	-	182
1974	-	-	198
1975	-	-	215
1976	215	-	216
1977	224	217	232
1978	238	-	239
1979	246	247	256

Notes:

1. The Medical Services Plan count includes all chiropractors billing the plan during the fiscal year ending 1979. The data was obtained through correspondence with MSP.

2. The Health Manpower Research Unit count includes resident chiropractors with British Columbia registration. The data source is Roll Call 79.

3. The count provided by British Columbia Chiropractic Association includes all chiropractors with active registration. The source is the Canada Manpower Inventory, 1978.

TABLE II.1.2

TOTAL NUMBER OF CHIROPRACTORS

REGISTERED IN BRITISH COLUMBIA BY AGE, 1980

AGE GROUPS	NUMBER
21 - 25	9
26 - 30	45
31 - 35	41
36 - 40	38
41 - 45	19
46 - 50	27
51 - 55	29
56 - 60	20
61 - 65	25
66 - 70	11
70 and over	6
Total	270

Note: 1. The age distribution based on the official registry was provided by the BCCA.

TABLE II.1.3

FACTORS AFFECTING MANPOWER SUPPLY

CHIROPRACTIC, BRITISH COLUMBIA

FACTOR	ASSUMPTION	SOURCE
Opening stock	270	Records of the BCCA[1]
Net migration	12 per year	Records of the BCCA and CMCC[2]
Net immigration	3 per year	Records of the BCCA
Net occupational shifts	0 per year	Interview with Executive of BCCA
Training output	0 per year	No training institution in B.C.
Active to inactive flows	0 per year	Interview with Executive of BCCA
Attrition	estimated age distribution and retirement at 65	Records of the BCCA

Notes: 1. British Columbia Chiropractic Association

2. Canadian Memorial Chiropractic College

c) Assumptions

i Stock

. Historical stock 1970 to 1979 - The total number of chiropractors in British Columbia from 1970 to 1979 is shown in Table II.1.1 opposite. The count provided by the Health Manpower Research Unit includes resident practitioners registered with the association. The British Columbia Chiropractic Association count defines stock as the total number of chiropractors with a British Columbia registration. The Medical Service Plan count only includes practitioners billing the plan during the fiscal year ending 1979. The difference in definitions accounts for the discrepancies in total numbers. In this study the statistics provided by the BCCA were used to maintain consistency with current stock data.

. Current stock - The most recent information on the number of registered chiropractors and their age distribution was supplied by the BCCA. The data is presented in Table II.1.2 opposite. In total, there are 270 chiropractors with British Columbia registrations.

ii Factors Affecting Manpower Supply

Table II.1.3, opposite, shows the assumptions made with respect to each of the factors which have the

potential to affect stock, that is, migration, immigration, occupational shifts, training output, active to inactive movements, and attrition. Each of these factors is discussed in more detail in the sections following.

. Net migration - Since 1970, the British Columbia Chiropractic Association records show 15 new registrants per year. According to the Executive, about 10 of these annual registrants are graduates of the Canadian Memorial Chiropractic College. On average, two chiropractors registered in other provinces also locate in British Columbia each year. Since out-migration of chiropractors from British Columbia is virtually nil, we have assumed an annual net migration of 12 persons over the forecast period.

. Net immigration - Approximately 25% of the registered chiropractors have graduated from chiropractic colleges in the United States. The registrar indicated that in recent years about 3 graduates per year from United States colleges have registered with the association. Consequently, we have assumed this rate of immigration will continue over the forecast period.

. Net occupational shifts - The lengthy training program for chiropractors precludes the upgrading of a related occupational group over a short period of time. The Executive of the BCCA reports no shifts out of the profession prior to

retirement by licensed chiropractors in British Columbia. As a result, the value for occupational shifts is assumed to be zero from 1981 to 2000.

· Training Output - The Province of British Columbia does not offer a training program in chiropractic nor does it reserve places for British Columbia residents at the Canadian Memorial Chiropractic College through contractual arrangements. Training output is therefore assumed to be zero over the forecast period.

· Active to inactive flows - According to the Registrar of the BCCA, there are no inactive chiropractors in British Columbia, although a number of practitioners near retirement only work on a part-time basis. These part-time practitioners are included in the definition of chiropractic manpower because the distribution of full to part-time practitioners is not known.

The future stock of chiropractors may be affected by the age-sex distribution, if female labour force participation is less than that of males. Females now make up 20 to 25% of enrolments at the Canadian Memorial Chiropractic College, an increase relative to the past ratio. The sex distribution of chiropractors in British Columbia was not provided by their association. Since there is no data for assessing the working-life patterns of female chiropractors, the active to inactive flow is assumed to be zero for 1981 to 2000.

TABLE II.1.4

TOTAL PAYMENTS FOR CHIROPRACTIC SERVICES

BY AGE AND SEX OF PATIENT, BRITISH COLUMBIA, 1980

AGE GROUP	MALE	FEMALE	
Under 1	6,549	5,147	
1 - 4	36,936	33,411	
5 - 14	141,670	147,315	
15 - 24	479,674	615,073	
25 - 44	1,720,075	1,944,969	
45 - 64	1,324,409	1,420,491	
65 - 74	341,920	378,320	
Over 74	68,860	74,723	
	4,120,093	4,619,449	8,739,542
Unknown			1,231,130
Total			9,970,672

Source: The Medical Services Plan, Ministry of Health. As service counts were considered unreliable, payment data was used. The payment data is based on date of payment, not date of service.

TABLE II.1.5

TREND IN PER CAPITA UTILIZATION

OF CHIROPRACTIC SERVICES IN BRITISH COLUMBIA

YEAR	PAYMENT IN CURRENT $	APPROXIMATE PAYMENT IN 1976	POPULATION (000)	PAYMENT IN 1976 $ PER CAPITA
1976	$6,617,825	$6,617.000	$2,476.1	$2.67
1977	$7,648,112	$7,069.000	$2,506.4	$2.82
1978	$8,144,892	$7,120.000	$2,545.3	$2.80
1979	$8,924,460	$7,483.000	$2,591.8	$2.89
1980	$9,970,672	$7,801.000	$2,626.4	$2.97

Note: Annual compound increase of 2.7% in 1976 $ payments.

Source: The Medical Services Plan, Ministry of Health

. Attrition from death and retirement - The 1980 age distribution of registered chiropractors provided by the BCCA was used to determine retirements from 1981 to the year 2000. We have assumed that all chiropractors retire at 65. Due to the high joint probability of death and retirement, and the small size of the occupational group, we have not made separate estimates of attrition from death.

iii Requirements

. Historical population ratio - The 1980 ratio of chiropractors to British Columbia population of 1:9,715 was applied against projected population to determine the size of the stock required to maintain the current service level over time.

. Utilization - Total payments for chiropractic services by age and sex of patient under the Medical Services Plan in 1980, as presented in Table II.1.4, opposite, were used to develop specific age-sex utilization rates. These rates were applied to the age-sex population forecasts, and manpower requirements were then projected, assuming a constant payment per practitioner. The trend in per capita service utilization is shown in Table II.1.5, opposite.

. Service target ratio - Requirements were projected using a service target ratio of chiropractors to population of 1:10,000.

TABLE II.1.6

NET REQUIREMENTS, BRITISH COLUMBIA, CHIROPRACTORS

(Incremental and Cumulative)

YEAR	Low Population Scenario						Medium Population Scenario						High Population Scenario					
	LOW		MEDIUM		HIGH		LOW		MEDIUM		HIGH		LOW		MEDIUM		HIGH	
	B	B	A	A	C	C	B	B	A	A	C	C	B	B	A	A	C	C
1981	-16	-16	-8	-8	-7	-7	-14	-14	-6	-6	-5	-5	-11	-11	-3	-3	-3	-3
1982	-7	-23	-7	-15	-5	-12	-5	-19	-5	-11	-4	-9	-5	-16	-5	-8	-4	-7
1983	-7	-30	-7	-22	-7	-19	-7	-26	-6	-17	-6	-15	-6	-22	-6	-14	-5	-12
1984	-8	-38	-8	-30	-6	-25	-6	-32	-7	-24	-5	-20	-6	-28	-5	-19	-5	-17
1985	-8	-46	-7	-37	-6	-31	-6	-38	-6	-30	-5	-25	-6	-34	-6	-25	-4	-21
1990	-29	-75	-29	-66	-23	-54	-23	-61	-22	-52	-17	-42	-18	-52	-18	-43	-15	-36
1995	-36	-111	-36	-102	-30	-84	-31	-92	-30	-82	-26	-68	-26	-78	-25	-68	-22	-58
2000	-30	-141	-29	-131	-24	-108	-24	-116	-23	-105	-18	-86	-20	-98	-19	-87	-15	-73

Requirements derived using:

A. Historical ratio approach of 1:9,715 achieved in 1980
B. Service target ratio approach of 1:10,000
C. Utilization approach based on current services. (No productivity increase)

d) Net Requirements

Table II.1.6, opposite, shows the net requirements (incremental and cumulative) for chiropractic.

. Highlights

Based on the medium population scenario, there is a surplus of manpower under each of the projection approaches used.

Under the historical population approach, there is a surplus of 105 chiropractors in the year 2000.

Under the service target approach, there is a surplus of 116 chiropractors in the year 2000.

Under the service utilization approach, (no productivity increase) there is a surplus of 86 chiropractors in the year 2000.

TABLE II.2.1

TOTAL NUMBER OF CHIROPRACTORS

IN ALBERTA, 1970 to 1979

YEAR	ALBERTA HEALTH CARE INSURANCE PLAN[1]	ALBERTA SOCIAL SERVICES AND COMMUNITY HEALTH[2]	ALBERTA CHIROPRACTIC ASSOCIATION[3]
1970	150	-	-
1971	168	-	-
1972	181	-	-
1973	186	-	195
1974	197	-	214
1975	214	-	231
1976	233	243	243
1977	248	249	249
1978	251	257	257
1979	257	258	258

Notes:

1. The count from the Alberta Health Care Insurance Plan includes chiropractors resident in the province who billed the plan in the fiscal year. The data was compiled from annual reports of the plan.

2. The Alberta Social Services and Community Health count includes chiropractors registered and active in the province. The source is the Report on Health and Social Service Manpower in Alberta, 1979.

3. The count provided by the Alberta Chiropractic Association includes registered practitioners active in the province. The data was obtained through correspondence with the Registrar.

3.2.2 ALBERTA

a) Legal Controls - The Chiropractic Profession Act of Alberta defines chiropractic as:

"the philosophy, science and art of analyzing and the adjustment or manipulation of the human spinal column and other structures incidental thereto, and includes the use of x-ray and analytical instruments in relation thereto."

Only persons registered by the Chiropractic Appraisal Board are authorized to practice chiropractic in Alberta. To qualify for registration, the applicant must have graduated from a recognized college, must have passed the prescribed examination, as well as be 21 years of age, and a resident of Canada.

b) Insured Services

The Alberta Health Care Insurance Plan covers chiropractic services up to a specified limit for individuals and families. The coverage includes a payment for x-rays for each particular disability. The limits are raised occasionally to account for inflation.

c) Assumptions

i Stock

. Historical stock 1970 to 1979 - The total number of active chiropractors in Alberta from 1970 to 1979 is shown in Table II.2.1, opposite. The counts provided by the Alberta Chiropractic Association (ACA) and Alberta Social Services and Community Health include resident practitioners

TABLE II.2.2

TOTAL NUMBER OF ACTIVE CHIROPRACTORS REGISTERED IN ALBERTA, BY AGE, 1980

AGE GROUP	NUMBER
Under 30	67
30 - 40	95
40 - 50	44
50 - 60	34
Over 60	18
Unknown	1
Total	259

Note: 1. The age distribution of active chiropractors was provided by the Executive Director of the A.C.A.

TABLE II.2.3

FACTORS AFFECTING MANPOWER SUPPLY

CHIROPRACTIC, ALBERTA

FACTOR	ASSUMPTION	SOURCE
Stock	259	ACA records
Net migration	12	ACA records
		CMCC records[2]
Net immigration	2	ACA records
Net occupational shifts	0	Interview with ACA Executive Director
Training output	0	No training facilities or interprovincial agreement
Active in active	0	Interview with ACA Executive Director
Attrition	1980 age distribution and retirement at 65	ACA records

Notes: 1. Alberta Chiropractic Association is ACA

2. Canadian Memorial Chiropractic College

registered with the association and in active practice in the province. However, the Alberta Health Care Insurance Plan only includes practitioners billing the plan during the fiscal year ending 1979. This difference in definition accounts for the discrepancies in total numbers. In this study, we used the statistics provided by the A.C.A.

. Current stock 1980 - The most recent information on the number of registered chiropractors active in the province, and their age distribution was supplied by the ACA. The data is presented in Table II.2.2, opposite. In total, there are 259 active chiropractors in the province.

ii Factors Affecting Manpower Supply

Table II.2.3, opposite, shows the assumptions made with respect to each of the factors which have the potential to affect stock, that is, migration, immigration, occupational shifts, training output, active to inactive movement, and attrition. Each of these factors is discussed in more detail in the sections following.

. Net migration - The expansion of the Canadian Memorial Chiropractic College first affected the size of the graduation class in 1976. According to the ACA records, 60 graduates or an average of 12 per year have located in Alberta from 1976 to 1980. The Executive Director of the ACA indicated that very few chiropractors relocate after

establishing a practice. Consequently, for Alberta chiropractic manpower projections, we have assumed 12 net migrants per year.

. Net immigration - Although a large proportion of ACA members have graduated from the United States Chiropractic Colleges, only 2 new registrants in 1979 and 1980 were United States graduates. This trend away from United States Colleges is largely the result of the expansion of the Canadian Memorial Chiropractic College. For our projections, we have assumed 2 net immigrants per year from 1981 to 2000.

. Net occupational shifts - The lengthy training program for chiropractors precludes the upgrading of a related occupational group over a short period of time. The Executive Director of the ACA reports no shifts out of the profession prior to retirement by licensed chiropractors in Alberta. In light of the above, the value for occupational shifts is assumed to be zero from 1981 to 2000.

. Training output - The Province of Alberta does not offer a training program in chiropractic nor does it reserve places for Alberta residents at the Canadian Memorial Chiropractic College through contractual arrangements. Training output is therefore assigned a value of zero for the forecast period.

· Active to inactive flows - According to the Executive Director of the ACA, there are no inactive chiropractors in Alberta, although a number of practitioners work only on a part-time basis. These part-time practitioners are included in the definition of chiropractic manpower as the distribution of full to part-time practitioners is not known.

The future stock of chiropractors may be affected by the occupation's age-sex distribution, if female labour force participation is less than that of males. While females now make up 20 to 25% of enrolment at the Canadian Memorial Chiropractic College, there are only 11 female chiropractors, less than 5% of the total active stock in Alberta. The Executive Director of the ACA reports that historically, Alberta female chiropractors have remained active during child-bearing years. For this reason, the value for active to inactive flow is assigned to zero over the forecast period.

· Attrition from death and retirement - The 1980 age distribution of active chiropractors provided by the ACA was used to determine retirements from 1981 to the year 2000. We have assumed that chiropractors retire at 65. Due to the high joint probability of death and retirement and the small size of the occupational group, we have not made separate estimates of attrition from death.

TABLE II.2.4

TOTAL NUMBER OF CHIROPRACTIC SERVICES

BY AGE AND SEX OF PATIENT, ALBERTA, 1979 to 1980

	1977 to 1978	1978 to 1979
Male		
Under 1	251	415
1 - 4 years	3,178	4,070
5 - 14	17,956	18,467
15 - 24	71,875	78,935
25 - 44	211,861	228,922
45 - 64	160,390	161,126
65 and over	51,593	54,335
Total	517,104	546,270
Female		
Under 1	240	271
1 - 4 years	2,653	3,160
5 - 14	16,406	17,399
15 - 24	93,423	102,539
25 - 44	242,680	262,355
45 - 64	191,155	190,844
65 and over	65,916	69,877
Total	612,473	646,445
Grand Total	1,129,577	1,192,715

Source: Alberta Health Care Insurance Plan.

TABLE II.2.5

TREND IN PER CAPITA UTILIZATION OF

CHIROPRACTIC SERVICES IN ALBERTA

YEAR	SERVICES	POPULATION (000)	SERVICES/POPULATION
1970	-	-	-
1971	-	-	-
1972	815,125	1,670.6	.488
1973	878,371	1,702.6	.516
1974	891,836	1,741.4	.512
1975	906,446	1,799.0	.504
1976	937,151	1,860.7	.504
1977	1,028,415	1,919.1	.536
1978	1,031,828	1,976.1	.522
1979	1,137,305	2,034.7	.559
1980	1,192,715	2,068.8	.577

Note: Compound increase of 2.10% in per capita services

Source: Alberta Health Care Insurance Plan

TABLE II.2.6

NET REQUIREMENTS, ALBERTA, CHIROPRACTORS

(Incremental and Cumulative)

YEAR	Low Population Scenario						Medium Population Scenario						High Population Scenario					
	LOW		MEDIUM		HIGH		LOW		MEDIUM		HIGH		LOW		MEDIUM		HIGH	
	C	C	A	A	B	B	C	C	A	A	B	B	C	C	A	A	B	B
1981	-56	-56	-4	-4	-2	-2	-54	-54	-1	-1	0	0	-52	-52	1	1	1	1
1982	-5	-61	-4	-8	-2	-4	-1	-55	0	-1	1	1	-2	-54	0	1	0	1
1983	-5	-66	-3	-11	-2	-6	-1	-56	1	0	1	2	-3	-57	-1	0	0	1
1984	-5	-71	-5	-16	-4	-10	-3	-59	0	0	0	2	-2	-59	-1	-1	-1	0
1985	-7	-78	-5	-21	-3	-13	-4	-63	-2	-2	-1	1	-3	-62	0	-1	-1	-1
1990	-30	-108	-24	-45	-18	-31	-18	-81	-10	-12	-6	-5	-10	-72	1	0	2	1
1995	-32	-140	-28	-73	-18	-49	-20	-101	-12	-24	-5	-10	-9	-81	1	1	4	5
2000	-29	-169	-23	-96	-12	-61	-16	-117	-8	-32	3	-7	-4	-85	7	8	15	20

Requirements derived using:

A. Historical ratio approach of 1:8,039 achieved in 1980
B. Utilization approach based on current services
C. Service target ratio approach of 1:10,000

iii Requirements

. Historical population ratio - The 1980 ratio of chiropractors to Alberta population of 1:8,039 was applied against projected population to determine the size of the stock required to maintain the current service level over time.

. Utilization - The total number of chiropractic services by patient age and sex for 1978 and 1979 was obtained from the Alberta Health Care Insurance Plan and is presented in Table II.2.4, opposite. The average number of chiropractic services provided to each age-sex grouping for 1978 and 1979 was used to develop specific utilization rates. These rates were applied to the age-sex population forecasts, and manpower requirements were then projected assuming constant chiropractor services per practitioner.

The trend in per capita service utilization is shown in Table II.2.5, opposite.

. Service target ratio - Requirements were projected using a service target ratio of chiropractors to population of 1:10,000.

d) Net Requirements

Table II.2.6, opposite, shows the net requirements (incremental and cumulative) for chiropractic.

. Highlights

Based on the medium population scenario, there is a surplus of manpower under each of the projection approaches used.

Under the historical population approach, there is a surplus of 32 chiropractors in the year 2000.

Under the service target approach, there is a surplus of 117 chiropractors in the year 2000.

Under the service utilization approach (no productivity increase), there is a surplus of 7 chiropractors in the year 2000.

TABLE II.3.1

NUMBER OF CHIROPRACTORS IN

SASKATCHEWAN, 1970 to 1980

YEAR	CHIROPRACTORSS ASSOCIATION OF SASKATCHEWAN			SASKATCHEWAN MEDICAL CARE INSURANCE COMMISSION[2]
	MALE	FEMALE	TOTAL	
1970	39	3	42	N/A
1971	37	3	40	N/A
1972	39	3	42	N/A
1973	43	3	46	38
1974	47	3	50	47
1975	50	3	53	48
1976	45	3	48	49
1977	56	3	59	57
1978	57	4	61	58
1979	66	5	71	61
1980	72	4	76	N/A

Notes: 1. Chiropractors Association of Saskatchewan. Correspondence with Registrar's Office.

2. SMCIC insured chiropractic services were introduced in 1973. The SMCIC count includes only chiropractors earning $10,000 or more from 1973 to 1977, and $20,000 or more thereafter.

3.2.3 SASKATCHEWAN

a) Legal Controls - The Chiropractic Act (R.S.S. 1978 Ch C-10) designates the practice of chiropractic in Saskatchewan as:

"the science and art of treatment, by diagnosis (including all diagnostic methods), spinal analysis, direction, advice, written or otherwise, of any ailment, disease, defect or disability of the human body, by methods of adjustment by hand of one or more of the several articulations of the human body, more especially those of the spinal column, taught in Colleges of Chiropractic."

The Board of Chiropractors of the Chiropractors Association of Saskatchewan (hereinafter CAS) is empowered by the Act, to make and enforce regulations pertaining to registration, examination, discipline, and complaints.

b) Insured Services

The Saskatchewan Medical Care Insurance Commission (hereinafter SMCIC) undertakes to insure for registered residents of Saskatchewan, all chiropractic visits and associated x-ray services. Services became insured in February 1973.

c) Assumptions

i Stock

. Historical stock 1970 to 1980 - The total number of chiropractors in Saskatchewan from 1970 to 1980 is shown in Table II.3.1, opposite. The CAS count includes all registered chiropractors regardless of activity status. The total number of active chiropractors provided by SMCIC excludes practitioners receiving less than a specified

TABLE II.3.2

TOTAL NUMBER OF ACTIVE RESIDENT CHIROPRACTORS IN SASKATCHEWAN, BY AGE AND SEX, 1979

AGE GROUP	MALE	FEMALE	TOTAL
Less than 20	-	-	-
20 - 24	2	-	2
25 - 29	9	1	10
30 - 34	10	1	11
35 - 39	9	-	9
40 - 44	4	-	4
45 - 49	9	-	9
50 - 54	8	-	8
55 - 59	4	1	5
60 - 64	1	-	1
65 and over	2	-	2
Total	58	3	61

Source: Saskatchewan Medical Care Insurance Commission

Notes: 1. Total active chiropractors include all practitioners receiving $20,000 or more in SMCIC payments during the year, and resident in Saskatchewan at the end of the year.

2. Swift Current Health Region totals are included in the above figures.

TABLE II.3.3

FACTORS AFFECTING MANPOWER SUPPLY

CHIROPRACTORS, SASKATCHEWAN

FACTOR	ASSUMPTION	SOURCE
Stock	76	C.A.S.
Net migration	5 every first year	C.A.S.
	6 every second year	S.H.M.
Net immigration	0	C.A.S.
Net occupational shifts	0	C.A.S.
Training output	0	
Active/inactive	0	C.A.S.
Attrition	Retirement at 65, based on 1979 age distribution of membership	S.M.C.I.C.

Notes: C.A.S. is Chiropractors Association of Saskatchewan
S.H.M. is Saskatchewan Health Manpower
S.M.C.I.C. is Saskatchewan Medical Care Insurance Commission

level of payment during a one year period. The SMCIC count is used in the following analysis.

. Current stock 1979 - The most recent information regarding the age-sex distribution of chiropractors was provided by SMCIC for 1979. The data is presented in Table II.3.2, opposite. The 1980 CAS count of chiropractors in Saskatchewan is 76, but it does not distinguish activity status.

ii Factors Affecting Manpower Supply

Table II.3.3, opposite, shows the assumptions made with respect to each of the factors which have the potential to affect stock, that is, migration, immigration, occupational shifts, training output, active to inactive stock, and attrition.

. Net migration - The Saskatchewan Health Manpower Annual Report 1978 presents information on attrition of chiropractic stock. This data, used in conjunction with the CAS president's estimate of net migration, suggests a net inflow of 11 chiropractors into Saskatchewan every two years. Five net additions to stock are assumed in every first year and 6 every second year.

. Net immigration - Net international movements of chiropractors in or out of Saskatchewan have virtually been non-existent according to the CAS president. On the basis of this information, the net immigration factor was assigned a value of zero over the forecast period.

. Net occupational shifts - The lengthy training program for chiropractors precludes the upgrading of a related occupational group, over a short period of time. The CAS president reports no shifts out of the profession by licensed chiropractors in Saskatchewan. In light of the above, the value of the occupational shift factor is assumed to be zero from 1981 to 2000.

. Training output - The Province of Saskatchewan does not offer a training program in chiropractic, nor does it reserve places for Saskatchewan students at the Canadian Memorial College of Chiropractic through contractual agreement. Training output is therefore assigned a value of zero for the entire forecast horizon.

. Active to inactive flows - According to the CAS president, there were no completely inactive chiropractors in Saskatchewan in 1980, although a number of practitioners worked only on a part-time basis. The difference between the SMCIC count of chiropractors and that of the CAS represents this part-time category. On average over the 1973 to 1979 period, about 5 chiropractors worked on a part-time basis. If these practitioners provided services to patients for approximately 30% of a normal workweek, then the net requirement for chiropractors is overstated by 1 or 2. No attempt was made to adjust the full-time SMCIC count by this amount.

Presently, only 5% of the Saskatchewan chiropractic stock is female. The CAS president does not report any significant differences between the labour force participation of male and female chiropractors in Saskatchewan. The female enrolments at the Canadian Memorial Chiropractic College in the past few years have represented between 20% to 25% of the total, and are unlikely to have a major impact on the active stock of chiropractors in the future. The active to inactive factor was assigned a value of zero for the entire forecast period to reflect this expectation.

. Attrition from death and retirement - The age distribution of active chiropractors provided by the SMCIC was used to determine retirements from 1981 to the year 2000. The CAS president has indicated that certain practitioners continue to work part-time beyond 65, while others retire prior to this age. These opposing forms of behavior are assumed to balance each other out, and therefore, all chiropractors are assumed to retire at age 65. The highest probability of mortality coincides with the age group 65 and over which, by assumption, has already been subtracted from the active stock through retirement.

iii Requirements

. Historical population ratio - The 1979 ratio of chiropractors to Saskatchewan population of

TABLE II.3.4

TOTAL NUMBER OF CHIROPRACTIC SERVICES,

SASKATCHEWAN, BY AGE AND SEX OF PATIENT, 1973 to 1979

	1973	1974	1975	1976	1977	1978	1979
MALE							
0-14 years	6,430	7,270	6,442	6,601	7,090	6,943	7,674
15 - 44	52,045	69,929	64,841	72,958	79,561	90,626	106,369
45 - 64	57,887	70,546	64,480	66,158	71,001	76,709	85,621
65 & over	20,121	22,830	22,213	23,120	25,929	28,868	31,101
Total	136,483	170,575	157,976	168,837	183,581	203,146	230,765
FEMALE							
0-14 years	5,787	7,526	6,061	6,180	6,449	6,571	7,429
15 - 44	65,450	85,531	81,072	90,788	101,424	110,314	131,536
45 - 64	72,635	86,867	80,190	83,339	88,933	94,528	103,844
65 & over	23,997	27,843	27,187	30,220	34,391	37,507	42,034
Total	167,869	207,767	194,510	210,527	231,197	248,920	284,843
Grand Total	304,352	378,342	352,486	379,364	414,778	452,066	515,608

Source: Saskatchewan Medical Care Insurance Commission, August 25, 1980

Note: 1. The total service figures include those provided to Saskatchewan residents outside their province.

TABLE II.3.5

NET REQUIREMENTS, SASKATCHEWAN, CHIROPRACTORS

(Incremental and Cumulative)

YEAR	Low Population Scenario						Medium Population Scenario						High Population Scenario					
	LOW		MEDIUM		HIGH		LOW		MEDIUM		HIGH		LOW		MEDIUM		HIGH	
	A	A	B	B	C	C	A	A	B	B	C	C	A	A	B	B	C	C
1981	-4	-4	-4	-4	31	31	-4	-4	-4	-4	32	32	-2	-2	-2	-2	35	35
1982	-4	-8	-4	-8	-4	27	-4	-8	-4	-8	-4	28	-4	-6	-4	-6	-3	32
1983	-5	-13	-4	-12	-4	23	-4	-12	-4	-12	-3	25	-3	-9	-4	-10	-3	29
1984	-5	-18	-6	-18	-5	18	-5	-17	-5	-17	-5	20	-5	-14	-5	-15	-4	25
1985	-3	-21	-3	-21	-3	15	-3	-20	-3	-20	-2	18	-3	-17	-3	-18	-2	23
1990	-20	-41	-20	-41	-18	-3	-17	-37	-18	-38	-15	3	-15	-32	-16	-34	-11	12
1995	-18	-59	-17	-58	-17	-20	-16	-53	-15	-53	-14	-11	-12	-44	-12	-46	-9	3
2000	-18	-77	-16	-74	-17	-37	-17	-70	-13	-66	-14	-25	-13	-57	-10	-56	-9	-6

Requirements derived using:

A. Historical ratio approach of 1:15,671 achieved in 1979
B. Utilization approach using current services
C. Service target ratio approach of 1:10,000

1:15,671 was applied against projected population to determine the size of stock required to maintain this level of service over time.

. Utilization - The total number of chiropractic services performed from 1973 to 1979, and paid by the SMCIC, are used to estimate historical per capita utilization and per practitioner services. Table II.3.4, opposite, includes chiropractic services performed by out-of-province practitioners, and leads to an over-estimation of per practitioner services, and consequently, to an understatement of net requirements. The importance of out-of-province services relative to in-province services is small, hence the effect on net requirements should be negligible.

. Service target ratios - Requirements were projected using a service target ratio of 1 chiropractor per 10,000 population.

d) Net Requirements

Table II.3.5, opposite, shows the net requirements (incremental and cumulative) for chiropractic.

. Highlights

Based on the medium population scenario, there is a surplus of manpower under each of the projection approaches used.

Under the historical population approach, there is a surplus of 70 chiropractors in the year 2000.

Under the service target approach, there is a surplus of 25 chiropractors in the year 2000.

Under the service utilization approach, there is a surplus of 66 chiropractors in the year 2000.

3.2.4 MANITOBA

a) Legal Controls - The Chiropractic Act defines the practice of chiropractic as:

"any professional service usually performed by a chiropractor the aim of which is to restore and maintain health and includes the diagnostics, treatment and prophylaxis of functional disturbances, pathomechanical states, pain syndromes and neurophysiological effects related to the statics and dynamics of the locomotor system, more particularly the spine and pelvis. The treatment thereof by adjustment and/or manipulation of the spine, and other anatomical structures. The use of x-ray for diagnostic purposes."

Only individuals who have successfully completed junior matriculation and graduated from an approved school or college of chiropractic are eligible for certification. This requires that the individual complete and pass examinations of the examining committee. All active practitioners must be registered by the Manitoba Chiropractors' Association. The use of x-rays requires a certificate of competency from the Board of the Association.

b) Insured Services

Insured services under the Manitoba Health Services Commission provided by chiropractors are for the palpating and adjusting by hand of the articulations of the spinal column and other articulations. The amounts payable for the 1980 calendar year are limited to a specified maximum for individuals and families.

TABLE II.4.1

TOTAL NUMBER OF CHIROPRACTORS IN MANITOBA, 1970 to 1979

YEAR	MANITOBA CHIROPRACTORS ASSOCIATION	MANITOBA HEALTH SERVICES COMMISSION
1970	47	43
1971	49	46
1972	48	44
1973	47	43
1974	48	45
1975	53	49
1976	58	52
1977	62	60
1978	63	61
1979	66	64

TABLE II.4.2

TOTAL NUMBER OF ACTIVE RESIDENT CHIROPRACTORS

BY AGE AND SEX, 1980, MANITOBA

AGE GROUP	MALE	FEMALE	TOTAL
Less than 20	-	-	-
20 - 24	-	-	-
25 - 29	16	-	16
30 - 34	17	1	18
35 - 39	2	-	2
40 - 44	6	-	6
45 - 49	8	-	8
50 - 54	8	-	8
55 - 59	3	-	3
60 - 64	2	-	2
65 and over	1	-	1
Total	63	1	64

Source: Manitoba Chiropractors Association

TABLE II.4.3

FACTORS AFFECTING MANPOWER SUPPLY

CHIROPRACTORS, MANITOBA

FACTOR	ASSUMPTION	SOURCE
Stock	64	M.C.A.
Net migration	4 per year	M.C.A.
Net immigration	-1 every 2nd year	M.C.A.
Net occupational shifts	0 per year	
Training output	0 per year	
Active/inactive	0 per year	M.C.A.
Attrition	Retirement at 65 based on 1980 age distribution	M.C.A.

Note: M.C.A. is Manitoba Chiropractors Association

c) Assumptions

i Stock

. Historical stock 1970 to 1979 - The total number of chiropractors in Manitoba for the period 1970 to 1979 is shown in Table II.4.1, opposite. The Manitoba Chiropractor's Association (MCA) count includes all registered chiropractors, regardless of status. The total number of active chiropractors reported by the Manitoba Health Services Commission (MHSC) excludes practitioners receiving less than $10,000 per year. The MHSC count is used in the following analysis, on the assumption that it does not overstate the actual supply of practitioners.

. Current stock - The most recent information regarding the age-sex distribution of chiropractors was supplied by the Registrar of the MCA, and is based on the age/date of birth on provincial registration papers. This data is shown in Table II.4.2., opposite.

ii Factors Affecting Manpower Supply

Table II.4.3, opposite, shows the assumptions made with respect to each of the factors which have the potential to affect stock, that is, migration, immigration, occupational shifts, training output, active to inactive stock and attrition.

. Net migration - The analysis of historical registrations completed by the Registrar of the MCA, indicated a net inflow of 4 chiropractors per

year into Manitoba.

. Net immigration - The analysis of historical membership rosters completed by the Registrar of the MCA indicated a net loss of 1 chiropractor every two years from Manitoba.

. Net occupational shifts - The formal training program for chiropractic precludes the upgrading of a related occupational group over a short period of time. The Registrar of MCA reports no shifts out of the occupation by licensed practitioners in Manitoba. This variable has been assumed to be zero from 1981 to 2000.

. Training output - There is no training program for chiropractors in the Province of Manitoba, and no formal training agreement exists between the province and the Canadian Memorial Chiropractic College. All graduates entering the province are shown as net migrants.

. Active to inactive flows - According to the Registrar of MCA there are two inactive practitioners who, although registered in the province, practice in Ontario. The difference between the MHSC count and the MCA count represents those practitioners earning less than $10,000 per year. On average over the last three years, this figure has been 2 individuals.

TABLE II.4.4

TOTAL NUMBER OF CHIROPRACTIC SERVICES, MANITOBA

BY AGE AND SEX OF PATIENT, 1970 - 1979

	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979
MALE										
00-14	9,570	10,156	10,750	11,030	10,866	11,096	12,978	17,277	19,460	22,195
15-44	66,720	70,805	74,626	76,895	75,749	79,306	89,042	111676	126488	148103
45-64	44,298	47,010	49,547	51,053	50,292	52,544	56,597	67,498	71,821	79,400
65+	13,125	13,929	14,681	15,127	14,901	16,318	18,025	22,828	25,528	29,117
Total	133713	141900	149604	154105	151808	159264	176642	219279	242297	278815
FEMALE										
00-14	8,477	8,996	9,481	9,769	9,624	10,117	12,257	15,756	16,049	20,136
15-44	66,720	70,805	74,627	76,895	75,749	80,285	90,123	113556	130852	152279
45-64	48,126	51,073	53,829	55,465	54,639	56,460	59,841	70,900	79,645	86,379
65+	16,406	17,411	18,350	18,909	18,627	20,234	21,630	28,064	31,748	34,380
Total	139729	148285	156287	161038	158639	167096	183851	228276	258294	293174
Grand										
Total	273442	290185	305891	315143	310447	326360	360493	447556	500591	571989

Source: Manitoba Health Services Commission

Currently, there is only 1 female chiropractor registered in the Province of Manitoba. The female enrolment at the Canadian Memorial Chiropractic College in the past 5 years has been between 20% and 25% of total enrolments. This is unlikely to result in a major impact on the active stock of chiropractors in the future. The active to inactive factor has assigned a value of zero for the active forecast period on this assumption.

. Attrition from death and retirement - The age distribution of active chiropractors provided by both MCA and MHSC was used to determine retirements from 1981 to 2000. The Registrar of MCA indicated that normal retirement age was approximately 65, although some practitioners retired before this date, while others remained in practice. Therefore, retirement at 65 has been assumed for the period 1981 to 2000.

iii Requirements

. Historical population ratios - Requirements for chiropractors were projected using the following historical ratio of practitioners to population of 1:16,350.

. Utilization - The number of insured chiropractic services provided to each age-sex group for the years 1970 to 1979 was derived from information supplied by the Manitoba Health Services Commission. Table II.4.4, opposite, shows chiropractic services by age and sex of patients from 1970 to 1979.

TABLE II.4.5

TRENDS IN PER CAPITA UTILIZATION

OF CHIROPRACTIC SERVICES IN MANITOBA, 1970 to 1979

YEAR	TOTAL SERVICES	POPULATION	SERVICES PER POPULATION
1970	273,442	981,000	0.278
1971	290,185	988,000	0.294
1972	305,891	991,500	0.309
1973	315,143	997,800	0.316
1974	310,447	1,010,900	0.307
1975	326,360	1,018,300	0.320
1976	360,493	1,021,500	0.353
1977	447,556	1,029,100	0.435
1978	500,591	1,032,900	0.485
1979	571,989	1,046,800	0.546

Source: Manitoba Health Services Commission, Annual Reports, 1970 to 1980.

TABLE II.4.6

NET REQUIREMENTS, MANITOBA, CHIROPRACTIC

(Incremental and Cumulative)

YEAR	Low Population Scenario						Medium Population Scenario						High Population Scenario					
	LOW		MEDIUM		HIGH		LOW		MEDIUM		HIGH		LOW		MEDIUM		HIGH	
	A	A	B	B	C	C	A	A	B	B	C	C	A	A	B	B	C	C
1981	-4	-4	2	2	37	37	-3	-3	2	2	38	38	-3	-3	2	2	38	38
1982	-3	-7	-4	-2	-3	34	-4	-7	-4	-2	-3	35	-3	-6	-3	-1	3	35
1983	-1	-8	0	-2	0	34	0	-7	0	-2	-1	34	-1	-7	-1	-2	6	35
1984	-3	-11	-4	-6	-3	31	-4	-11	-4	-6	-3	31	-3	-10	-3	-5	-3	32
1985	-3	-14	-2	-8	-3	28	-2	-13	-2	-8	-2	29	-3	-13	-3	-8	-2	30
1990	-12	-26	-12	-20	-10	18	-12	-25	-12	-20	-11	18	-11	-24	-11	-19	-10	20
1995	-6	-32	-5	-25	-6	12	-6	-31	-6	-26	-4	14	-6	-30	-5	-24	-4	16
2000	-9	-41	-7	-32	-7	5	-9	-40	-7	-33	-8	6	-8	-38	-7	-31	-7	9

Requirements derived using:

A. Historical ratio approach of 1:16,350
B. Utilization approach using current values
C. Service target ratio of 1:10,000

The trend in per capita service utilization is shown in Table II.4.5, opposite

. Service target ratio - Requirements were projected for a service target ratio of 1 chiropractor per 10,000 population.

d) Net Requirements

Table II.4.6, opposite, shows the net requirements, (incremental and cumulative) for chiropractic.

. Highlights

Based on the medium population scenario, there is a surplus of manpower under two of the projection approaches used.

Under the historical ratio approach, there is a surplus of 40 chiropractors in the year 2000.

Under the service utilization approach, there is a surplus of 33 chiropractors in the year 2000.

Under the service target approach, there is a net requirement for 6 additional chiropractors in the year 2000.

4.0 TRAINING RECOMMENDATIONS

4.1 Introduction

In this section of the report, we review the various alternatives for training location and funding arrangements for chiropractors in Western Canada. The alternatives are evaluated using the decision process outlined above. This process follows a series of steps in a logical process, and these are discussed below.

4.2 Step 1 - Analysis of Net Manpower Requirements

The projection of net manpower requirements under each of the approaches used, indicates that there is a surplus of approximately 10 to 13 chiropractors per year throughout the projection period.

4.3 Step 2 - Determine Indicated Training Response

There are no training programs for chiropractic in Western Canada, and none of the four western provincial governments currently finance any school of chiropractic, or provide any form of bursary or contracted training places. Thus, there are no potential training responses to limit the number of chiropractors in Western Canada.

4.4 Recommendations

We recommend:

1) That no training facility or training program be established for chiropractors in Western Canada

2) That no new initiatives are required to provide incentives for individuals to either enrol in chiropractic college, or to set up practices in Western Canada.

APPENDIX A

SCOPE AND CONTROL OF PRACTICE

CHIROPRACTORS: CONTROL OF PRACTICE

PROVINCE	CERTIFICATION/LICENSING/REGISTRATION			TRAINING PROGRAM/ACCREDITATION		
	Required Characteristics of Applicants	Certification Requirements	Licensing Requirements	Length of Training & Admission Requirements	Training Location	Educational Accreditation
BRITISH COLUMBIA	. Person of integrity and good moral character . British subject	. Proof of completion of one year at a recognized Canadian university or its equivalent . Graduate of a recognized college of chiropractic, with 4 years program and minimum of 8 months in each year . Proof of successful pass of examination of, or national registration under the National Examining Board of the Canadian Chiropractic Association	. Pass examinations of the examining board . Obtain a certificate of registration by the Board of Chiropractors . Must attend an educational seminar for at least 12 hours duration, not less than every 2 years, for renewal of registration and license . Yearly registration	. 4 year program	. No school of chiropractic in British Columbia . One school of chiropractic in Canada at Canadian Memorial Chiropractic College, Toronto	. Any college or school of chiropractic recognized by the Board of Chiropractors
ALBERTA	. 18 years old . Resident of Canada . Good character and reputation	. Graduate from a training program approved by the Chiropractic Appraisal Board . Member of the Canadian Chiropractic Association in good standing . Recipient of the degree of Doctor of Chiropractic from a college listed with the Board	. Pass an examination approved by the Chiropractic Appraisal Board . Register with Alberta Chiropractic Association . Manditory annual re-registration	. 4 year program	. No school of chiropractic in Alberta . One school of chiropractic in Canada at Canadian Memorial Chiropractic College, Toronto	. Basic educational requirements for Alberta registration are set by the Chiropractic Appraisal Board, a provincial government certification board . Any college or school of chiropractic approved by this board

(continued)

PROVINCE	CERTIFICATION/LICENSING/REGISTRATION			TRAINING PROGRAM/ACCREDITATION		
	Required Characteristics of Applicants	Certification Requirements	Licensing Requirements	Length of Training & Admission Requirements	Training Location	Educational Accreditation
SASK.	. 21 years old	. Graduate of a recognized school or college of chiropractic approved by the Board of Chiropractors of the Chiropractors Association of Saskatchewan, and course of 4 college periods of 8 months or more	. Pass an examination approved by the University of Saskatchewan (exam set by Canadian Chiropractic Examining Board) . Have application for registration approved by the Board of Chiropractors of the Association	. 4 school or college periods of eight months . Admission at Canadian Memorial Chiropractic College requires 2 years university education with a science background	. No school of chiropractic in Saskatchewan . Canadian Memorial Chiropractic College, Toronto (C.M.C.C.)	. Any school or college of chiropractic approved by the Board of Chiropractors of the Association
MANITOBA		. Proof of successfully completed junior matriculation . Graduate of a school or college of Chiropractic (minimum of 4 years duration)	. Pass examination of the examining committee . Register with the Manitoba Chiropractors Association . Use of X-rays requires certificate of competancy from the Board	. 4 year program . Admission to C.M.C.C. requires 2 years university education with a science background	. No school of chiropractic in Manitoba . Canadian Memorial Chiropractic College, Toronto (C.M.C.C.)	. Any recognized school or college of chiropractic

(continued)

APPENDIX B

OCCUPATION BIBLIOGRAPHY

BIBILIOGRAPHY ON CHIROPRACTIC

Alberta Chiropractic Association. The Chiropractic Profession of Alberta, 1976.

American Chiropractic Association. Chiropractic State of the Art, 1980.

American Chiropractic Association. "Health Planning: Nine Challenges for Chiropractic," A.C.A. Journal, November, 1978.

American Chiropractic Association. Miscellaneous published extracts as part of general correspondence

Canadian Memorial Chiropractic College. Calendar 1980

Kelner, Hall, Coutler. Chiropractors: Do They Help? ISBN 0-88902-578-9.

Commission of Inquiry into Chiropractic. Report of Commission, Chiropractic in New Zealand, 1979.

Trever. In The Public Interest.

Manitoba Chiropractors Association. Cost Implications of Various Changes to Method of Compensation of Chiropractors in the Province of Manitoba. September, 1979.

The Foundation for Chiropractic Education and Research. Chiropractic Health Care, March, 1977.

The New England Journal of Medicine. Sounding Board: The Future of Chiropractic, March, 1980.

Province of
British Columbia

Province of
Alberta

Province of
Saskatchewan

Province of
Manitoba

WESTERN CANADA
HEALTH MANPOWER TRAINING STUDY

Section III - Category # 1 - Report III

PODIATRY / CHIROPODY

REPORT III

PODIATRY AND CHIROPODY: THE REQUIREMENT FOR ALTERNATIVE TRAINING AND FUNDING ARRANGEMENTS IN WESTERN CANADA

REPORT III

CHIROPODY AND PODIATRY
THE REQUIREMENT FOR ALTERNATIVE TRAINING AND FUNDING ARRANGEMENTS IN WESTERN CANADA

TABLE OF CONTENTS

STUDY BACKGROUND, OBJECTIVES AND APPROACH	PAGE
Study Background - General Introduction	I
Study Origins	I
Study Objective	II
Study Timing	II
Study Approach	III

1. SUMMARY AND RECOMMENDATIONS

Introduction	1
Western Canada Overview	1
Manpower Training Recommendations	5

2. DISCUSSION OF OCCUPATION

Definition of Occupation	6
Role	6

TABLE OF CONTENTS (Continued) PAGE

3. NET MANPOWER REQUIREMENTS

GENERAL ASSUMPTIONS 12
. Manpower Stock 12
. Factors Affecting Manpower Supply 12
. Requirements 15
. Productivity 18
. Sensitivity Analysis 19

PROVINCIAL ASSUMPTIONS

. BRITISH COLUMBIA

. Legal Controls 20
. Insured Services 20
. Assumptions 21
. Stock 21
. Factors Affecting Manpower Supply 21
. Requirements 23
Net Requirements 24

. ALBERTA

. Legal Controls 26
. Insured Services 26
. Assumptions 27
. Stock 27
. Factors Affecting Manpower Supply 27
. Requirements 30
Net Requirements 31

TABLE OF CONTENTS (Continued) PAGE

PROVINCIAL ASSUMPTIONS (Continued)

. SASKATCHEWAN

. Legal Controls 32
. Insured Services 32
. Assumptions 33
. Stock 33
. Factors Affecting Manpower Supply 34
. Requirements 36
Net Requirements 37

. MANITOBA

. Legal Controls 38
. Insured Services 38
. Assumptions 39
. Stock 39
. Factors Affecting Manpower Supply 39
. Requirements 41
Net Requirements 41

4. TRAINING RECOMMENDATIONS 43

Appendix A - Scope And Control of Practice
Appendix B - Occupation Bibliography

STUDY BACKGROUND, OBJECTIVES AND APPROACH

STUDY BACKGROUND - GENERAL INTRODUCTION

The provision of effective health services to the community is, to a considerable degree, dependent on three essential resources:

- an adequate supply of well trained specialist staff in each health occupation group
- the development of adequate facilities to service the community
- the availability of adequate funds to ensure cost effective and efficient health services.

The range and complexity of health treatment programs has expanded greatly in Canada during the last twenty five years. In addition, changing technology and the development of new treatment programs have resulted in an increased requirement for skilled, adequately trained health manpower. These factors have resulted in an increased emphasis on manpower planning and skill training for health occupations to ensure an adequate supply of trained practitioners to meet defined manpower requirements.

STUDY ORIGINS

The Western Canada Health Manpower Training Study was initiated by the Western Premiers at their annual conference in 1980. The study is under the direction of a Steering Committee comprised of government representatives from the Provinces of British Columbia, Alberta, Saskatchewan and Manitoba. The members of the Steering Committee represent both the Health and Education departments within each provincial government.

STUDY OBJECTIVES

The study terms of reference contain two major objectives. These are:

- to assess the existing and future needs for health manpower training programs and facilities in Western Canada

- to make recommendations for the rationalization of the location and funding of health manpower training programs and facilities in Western Canada.

STUDY TIMING

The study consists of a review of 26 health occupations to be examined in five categories. The initial category consists of five occupations, selected for the study on the basis of current availability of training programs in Western Canada. Although the study is divided into five categories for review, each occupation within these is to be studied independently over the next two years. Several of the occupations are inter-related. The requirement for one kind of manpower may be influenced by that of another, yet the two occupations may not be reviewed at the same time. Therefore, the study recommendations should be reviewed once all the occupations have been studied.

STUDY APPROACH

Introduction

In order to achieve the study objectives, the work program consists of three key activities. These are:

- the analysis of manpower supply and requirements, and the calculation of net manpower requirements
- the analysis of existing training programs for Western Canada
- the development of recommendations for alternative training locations and funding arrangements

Analysis of Manpower Supply and Requirements

The analysis of manpower supply and requirements is designed to allow for a variety of data inputs, and for different emphasis depending on the occupation under review. A variety of data sources are used including provincial and national associations, health insurance agencies, and provincial health and education departments. In all instances, data is developed independently of previously published sources.

In addition to the basic projection of net manpower requirements, a number of sensitivity analyses have been completed to assess the impact of changes in the factors affecting supply and requirements, prior to developing recommendations for either additional training programs, or expanding existing training programs.

Approaches to Determining Manpower Requirements

The approach developed to determine manpower requirements uses three methods of projection. These are discussed below.

1. Service Utilization Approach

The utilization approach is based on an analysis of the pattern of health service usage. It establishes trends in service utilization and projects these onto future population estimates. There are three steps in the service utilization approach.

Step 1 - Determine Per Capita Utilization Rate

Historical data of the number of services provided, by age and sex of recipient is derived. The number of services per age/sex group is then divided by the population for that group in the corresponding year. This results in a per capita utilization rate.

Step 2 - Project Future Service Required

The per capita utilization rate is projected onto the low, medium and high population for each year from 1981 to 2000. This results in an estimate of total future services.

Step 3 - Estimated Number of Practitioners Required

Having determined the total future services, the model projects the number of practitioners required, by assuming a constant level of services per practitioner. The number of services per

practitioner is determined by dividing total services by the number of practitioners in the base year. To estimate the required number of practitioners, the model divides total future services required by the number of services per practitioner.

2. Service Target Ratio Approach

Service target ratios reflect a theoretical optimal manpower level required to meet health service requirements in the occupation under review. They are expressed as the ratio of practitioner to population. The service target ratios are derived based on discussion with health authorities, review of published reports, articles and summary of defined health care needs.

3. Population Ratio Approach

Population ratios are derived by dividing the total population at a specified point in time by the number of active practitioners. This results in a ratio of practitioners to population.

These ratios are analysed to determine if any trends exists. To project future manpower requirements, the model divides total projected population by the previously determined population ratio.

EXAMPLE 1

TABLE

NET REQUIREMENTS

(Incremental and Cumulative)

YEAR	Low Population Scenario						Medium Population Scenario						High Population Scenario					
	LOW		MEDIUM		HIGH		LOW		MEDIUM		HIGH		LOW		MEDIUM		HIGH	
	B	B	A	A	C	C	B	B	A	A	C	C	B	B	A	A	C	C
1981	1	1	1	1	6	6	1	1	1	1	7	7	4	4	4	4	10	10
1982	-1	0	-1	0	-1	5	-1	0	-1	0	-1	6	-1	3	0	4	0	10
1983	-2	-2	-2	-2	-2	3	-1	-1	-1	-1	-1	5	-1	2	-2	2	-1	9
1984	-3	-5	-4	-6	-3	0	-3	-4	-3	-4	-3	2	-2	0	-2	0	-2	7
1985	8	3	8	2	8	8	9	5	8	4	9	11	9	9	9	9	9	16
1990	0	3	0	2	0	8	2	7	3	7	3	14	6	15	7	16	7	23
1995	-12	-9	-12	-10	-12	-4	-8	-1	-9	-2	-9	5	-4	11	-5	11	-4	19
2000	-10	-19	-11	-21	-10	-14	-6	-7	-7	-9	-7	-2	-2	9	-2	9	-2	17

Requirements derived using:

A. Historical ratio approach of 1:10,621 achieved in 1976
B. Utilization approach using curent services. No productivity
C. Service target ratio approach of 1:10,000

Summary of Approaches to Projecting Manpower Requirements

The three approaches outlined above have been used for the calculation of manpower requirements for this occupation. The specific application of each approach to this occupation is discussed under Requirements (Section 3.1.3 below).

Presentation of Provincial Net Manpower Requirements

At the conclusion of each provincial section of this report, Section (d) summarizes net manpower requirements, and shows both the incremental and cumulative requirement for each approach within three population scenarios. Example 1, opposite, shows a typical net requirement table.

The table is divided into three sections, low, medium, and high population scenarios. Within each section, low, medium, and high manpower requirement estimates are shown. The manpower requirement approach used to derive these is identified by a letter (A,B,C), which refers to the footnotes. Within each approach, two set of figures are shown for each time point. The left hand column shows the incremental net requirement, and the right hand column shows the cumulative net requirement.

Analysis of Existing Training Programs in Western Canada

This initial study category is composed of occupations for which there are currently no training programs in Western Canada. As part of this initial study we have, however, developed a basic approach for analysing existing training programs for subsequent occupation categories.

Development of Recommendations for Alternative Training Locations and Funding Arrangements

We have developed a decision process to assist in developing recommendations for alternative training location(s) and funding arrangements. This process is designed to allow for the logical, consistent evaluation of a range of training alternatives.

There are seven steps in the decision process:

- Step 1. Analysis of manpower requirements
- Step 2. Identification of the appropriate type(s) of training
- Step 3. Definition of alternative training locations
- Step 4. Evaluation of alternative locations for new programs
- Step 5. Establishment of timing of training program requirement
- Step 6. Recommendation on training action(s) and location(s)
- Step 7. Recommendation on funding alternative(s)

Recommendations for future training location and funding arrangements specific to this occupation are discussed in Section 4, below.

EXHIBIT 1 Net Manpower Requirements - Podiatry - Western Canada, 1981 to 2000

(MEDIUM POPULATION PROJECTION)

ALTERNATIVE	YEAR	1981	1982	1983	1984	1985	1990	1995	2000
1. Podiatry (B.C. and Alta. only) Population Ratio	Cumulative	1	0	0	-3	-5	-6	-18	-30
	Incremental	1	-1	0	-3	-2	-1	-12	-12
2. Podiatry (B.C. and Alta. only) Target Ratio - 1:91,000	Cumulative	-4	-4	-4	-7	-7	-10	-22	-34
	Incremental	-4	0	0	-3	0	-3	-12	-12
3. Chiropody - Western Canada Region Target Ratio - 1:30,000	Cumulative	218	225	232	235	241	261	284	303
	Incremental	218	7	7	3	6	20	23	19
4. Chiropody - Western Canada Region Target Ratio 1:20,000	Cumulative	333	341	350	357	365	397	433	461
	Incremental	333	8	9	7	8	32	36	28

1. SUMMARY AND RECOMMENDATIONS

1.1 INTRODUCTION

The report addresses the projected net requirement for podiatrists/chiropodists in the Province of British Columbia, Alberta, Saskatchewan and Manitoba for the period 1981 to 2000.

The study process begins with an assessment of the current stock of podiatrists and chiropodists in each province, and of the factors likely to influence this stock in the future. The net requirement for podiatrists and chiropodists over the projected period is obtained from a comparison of projected manpower supply and requirements.

For each province and the Western Region, the projected future net requirements for podiatry and chiropody are subjected to a sensitivity analysis in order to determine the importance of underlying assumptions to the net result. The last step of the study process is to determine the requirement for alternative locations and funding arrangements for the training of podiatrists/chiropodists in Western Canada. The recommendations concerning training are summarized below.

1.2 WESTERN CANADA OVERVIEW

Exhibit 1, opposite, shows the manpower requirements for

podiatry/chiropody for Western Canada. The requirements have been derived using the medium population projection, and represent four alternative scenarios. These net manpower requirements are based on:

1. The current population ratio for podiatrists in British Columbia and Alberta only.

2. The target ratio of 1 podiatrist for 91,000 population for British Columbia and Alberta only.

3. The target ratio of 1 chiropodist for 30,000 population for Western Canada.

4. The target ratio of 1 chiropodist for 20,000 population for Western Canada.

In the projection for chiropodists, (3 and 4 above), the net manpower requirements were derived for each province, and these have been combined to determine the net manpower requirements for Western Canada.

Highlights

Problems Related To Inconsistent Foot Care Programs

The determination of manpower requirements for podiatrists and chiropodists in Western Canada poses some unique problems, since there is no consistent approach to the delivery of foot care services between provinces. British Columbia and Alberta recognize the qualifications of American trained podiatrists, but limit their scope of practice to essentially palliative foot services. Podiatrists and chiropodists are both allowed

to practice in Saskatchewan and Manitoba, but podiatrists are restricted to the same legislated role as chiropodists. British Columbia and Alberta insure foot care serivces, but the other provinces do not. Saskatchewan has indicated its intention to introduce some form of foot care benefits in the future, but Manitoba has not.

In the projection period, Western Canada will have an aging population requiring enhanced foot care. The optimal way to meet this need is to institute a two-tier foot care system in which specialized medical foot services are provided by podiatrists or the medical profession, and basic foot care is provided by chiropodists. Other foot care strategies are more costly, and the projections for foot care personnel needs in the forecast period have been based on the assumption that a two-tier foot care system will be established in Western Canada.

Podiatrists

1. Projected at the current population ratio, there is a surplus of 30 podiatrists by the year 2000 for British Columbia and Alberta. Because of the limited number of podiatrists and chiropodists in Saskatchewan and Manitoba, we have not attempted to project on the basis of the current population ratio for these provinces.

2. For British Columbia and Alberta, where podiatrists are currently providing basic foot care, we have projected a service target ratio of 1:91,000 for the provision of specialized foot care services. This indicates a surplus of 34 podiatrists in these two provinces, by the year 2000.

Chiropodists

1. Projected at a service target ratio of 1:30,000 to reflect a minimum standard of service there is a net manpower requirement of 300 chiropodists, by the year 2000, for Western Canada.

2. Projected at a service target ratio of 1:20,000, the service level defined in the Province of Ontario, there is an indicated net manpower requirement of 460 chiropodists, by the year 2000 for Western Canada.

1.3 MANPOWER TRAINING RECOMMENDATIONS

- That no training program in podiatry be established in Western Canada.

- That one training program in chiropody be established in Western Canada to provide the required manpower.

- That this training program be established in a college level institution, either in British Columbia or Alberta, which currently offers a basic registered nurse program. Potential sites in British Columbia are: Cariboo College, Okanagan College, British Columbia

Institute of Technology, Douglas College, Selkirk College, Vancouver Community College (Langara Campus), Camosun College and College of New Caledonia. Potential sites in Alberta are: Grant MacEwan Community College, Medicine Hat College, Mount Royal College, Red Deer College, and Lethbridge Community College.

- That all program costs be based on the proportion of training places allocated to each province (British Columbia 40.0%; Alberta 36.7%; Saskatchewan 13.3%; and Manitoba 10.0%).

- That an interprovincial training agreement be established for a minimum period of five years.

2. DISCUSSION OF THE OCCUPATION - PODIATRY/CHIROPODY

2.1 DEFINITION OF PODIATRIST/CHIROPODIST

A podiatrist or chiropodist is defined as a practitioner who:

"Diagnoses, prescribes for, and treats ailments, diseases, defects or disabilities of the human foot.

"Diagnoses foot ailments, such as tumors, ulcers, fractures, skin and nail diseases, and congenital, hereditary, or acquired deformities, utilizing such medically accepted methods as urinalysis, blood tests, and x-ray examiuation. Treats deformities, such as flat or weak feet and foot imbalance, by electrical and mechanical means. Treats ailments and conditions, such as corns, calluses and ingrown nails, using instruments, and prescribes or dispenses medications. Corrects deformities by means of plaster casts, strappings, braces, and prosthetic appliances. Prescribes corrective footwear. Advises patients concerning continued treatment of disorders and proper foot care to prevent recurrence. Refers patients to physicians and other medical specialists in the appropriate field of practice when symptoms observed in feet and legs indicate systemic disorders."[1]

2.2 ROLE

2.2.1 Historical Evolution

The practice of chiropody since the Middle Ages, has involved the cutting and scrapping of superficial skin lesions such as corns, callosities and warts on the hands and feet, as well as the treatment of ingrown nails and of bunions.[2]

1. Canadian Classification and Dictionary of Occupations, 1971, pg. 125, No. 3119-110.
2. Refer to the bibliography for general sources of information.

The practice of podiatry is a modern extension of chiropody, which has evolved from the recognition that systemic health conditions are frequently manifested through the lower limbs. It seeks to correct these disorders in order to prevent recurrence of the symptoms.

The specialization of chiropody into the medical specialty of podiatry occurred in the United States during the early sixties. General practitioners and orthopaedic surgeons obtained limited training in foot pathology, thus prompting podiatry to extend its scope of practice beyond simple palliative care, into the corrective treatment of the causes of foot problems. As podiatrists became increasingly specialized, they delegated many of the palliative functions to podiatric assistants. These assistants perform a range of services similar to those of the United Kingdom chiropodist.

2.2.2 Function

The nature of chiropody is palliative; the treatment of foot disorders and skin conditions is limited to the integument of the foot, and involves non-surgical procedures, with the exception of external cutting and scraping of the skin or nails. Podiatry by comparison, is essentially curative in orientation. It deals with "the examination, diagnosis, treatment, prevention and care of conditions and functions of the human foot by medical, surgical and other scientific knowledge and methods.[3] Chiropody treats the symptoms of chronic foot disorders; podiatry seeks to correct the deficiencies and deformities of the foot, and thereby alleviate the symptoms of the disorders.

3. Statement of Policy on the Delivery of Foot Care. Health Disciplines Committee, Ontario Ministry of Health.

2.2.3 Contribution To Health Care Delivery System

The podiatric examination in the United States is a point of entry into the health system for many patients. The American health system treats the podiatrist as a medical foot specialist able to administer medical and surgical treatment to the lower extremities, independently of other medical judgement. The American podiatrist in most states, can admit patients to hospital, and can undertake the overall health management of any systemic disorder that manifested itself through the lower extremities. Podiatrists also provide palliative treatment for foot conditions.

The United Kingdom chiropodist is a medical para-professional who, like the American podiatrist, is a primary care agent responsible for his own diagnosis and who provides a point of entry into the health system. The chiropodist treats the foot conditions of patients through a variety of scientific means, not including internal drugs and surgery. Upon recognition of a systemic disorder from lower limb manifestations, the chiropodist refers the patient to the proper medical channel for treatment.

In both countries, the majority of podiatrists and chiropodists are engaged in private practice, while a small minority hold staff positions with clinics, hospitals, and long-term care units.

Canada has not evolved a consistent approach to the delivery of foot care services across all provinces. This is reflected by the diversity of legislation respecting the recognition of appropriate foot care personnel. British Columbia and Alberta recognize only podiatrists,

while Saskatchewan and Manitoba recognize the two disciplines, but restrict both to the same scope of practice.

In general, podiatrists and chiropodists in Canada are limited to palliative care, and are prohibited from surgically intervening to correct the bones, muscles and tendons of the foot. Podiatrists and chiropodists in Western Canada have no acute hospital admission privileges. The majority work in private practice, while some provide services in nursing homes or community clinics.

The Province of Ontario recently stated its policy to enhance and promote foot care services for its residents. Ontario trained chiropodists will be employed by various health institutions or by public health clinics on a community basis. Rather than emphasize the prevalent private practice approach to foot care, Ontario wishes to develop a team of foot care personnel that will interact both in institutional and non-institutional settings. The present legislation is to be amended before 1981, to reflect this change in policy. Podiatrists currently practicing in Ontario will have the option to continue on a fee-for-service basis, or to be employed in the proposed system.[4]

2.2.4 Education

The American podiatrist receives an extensive medical training oriented towards the treatment of systemic diseases and structural deformities of the lower limbs. Minimum entrance requirements to all five Schools of Podiatric Medicine are equivalent to pre-medical school

4. Conversation with Director, Ontario Ministry of Health, Health Program Planning and Research, August, 1980.

entry requirements. Over 95% of students currently admitted have completed a bachelors degree in sciences or a related field.[5] The four year program emphasizes the clinical and laboratory aspects of the practice, including surgery, x-ray, anaesthesia and pharmacology.

The graduating Doctor of Podiatric Medicine usually completes his training as a resident or intern of a hospital, for a period of one to three years, depending on the degree of specialization desired.

The United Kingdom chiropodist receives a three year training course in one of ten technical colleges of chiropody. Entry to the chiropody training course is restricted to high school graduates who have completed two A levels and five O levels; these are about equivalent to a first year of university education. The program is oriented to providing the student with technical competence in undertaking palliative treatment of foot problems. Recently, additional courses in the fields of x-ray and laboratory procedures, anaesthesia and pharmacology have been introduced into the chiropodist training program.

There are no training programs for foot care personnel in Canada. The George Brown College of Applied Arts and Technology and the Toronto Institute of Medical Technology in Ontario are jointly developing a program to train chiropodists, consistent with the Ontario government intention to create a team approach to foot care. The program is scheduled to begin in 1981, and will initially train between 40 to 50 chiropodists every year.[6] The

5. Hedlin Henzies & Associates, Podiatry in Ontario, 1977.
6. Conversation with Director, Ontario Ministry of Health, Health Program Planning and Research, August, 1980.

program will likely be three years in duration, including one year of supervised clinical experience. Instruction will enable the chiropodist to distinguish between systemic and functional disorders of the body or feet, to competently treat these disorders, and to determine the appropriate referral for conditions beyond the scope of chiropody.[7]

In Quebec, the College of Rosemont submitted a proposal to the Ministry of Education in December 1979 to introduce a training program for chiropody (called podiatric in the proposal). The program would be offered through the college system, and be of 6 sessions in length, or three years. The projected enrolment would be 35 to 40 students. The Ministry of Education has not yet responded to the proposal, but it has previously stated its intention to allow the implementation of one training program in this field.[8]

To smooth the transition period before Ontario trained chiropodists graduate from the new program, a pilot 6 month full-time course in chiropody is also being established for registered nurses. In addition, the government is examining the potential to upgrade the skills of nursing assistants, so that they may be trained in chiropody. A second training program in chiropody will not be permitted until the Ontario government has defined an appropriate mix of chiropodists and other health personnel trained in chiropody.[9]

7. George Brown College, A Proposal Relating To The Training of Chiropodists, 1977.
8. College de Rosemont, Etude de la Podiatrie au Quebec.
9. Conversation with Director, Ontario Ministry of Health, Health Program Planning and Research, August, 1980.

TABLE III.0.1

TOTAL NUMBER OF PODIATRISTS AND CHIROPODISTS,

1970 to 1980, IN WESTERN CANADA

YEAR	BRITISH COLUMBIA[1]	ALBERTA[2]	SASKATCHEWAN[3]	MANITOBA[4]
1970	-	-	2	8
1971	28	8	2	8
1972	30	9	2	7
1973	25	11	2	7
1974	28	11	2	8
1975	28	13	3	8
1976	33	13	7	8
1977	37	13	3	7
1978	-	14	3	7
1979	36	14	2	7
1980	-	-	3	8

Notes: 1. 1971 - 1976 British Columbia Podiatry Association
1977 and 1979 Health Manpower Research Unit

2. Alberta Podiatry Association

3. Saskatchewan Association of Chiropodists

4. Association of Chiropodists in Manitoba

TABLE III.0.2

FACTORS AFFECTING MANPOWER SUPPLY

OF PODIATRY, CHIROPODY, WESTERN CANADA

FACTOR	BRITISH COLUMBIA	ALBERTA	SASKATCHEWAN	MANITOBA
Opening stock	41	15	3	8
Net migration	0	0	1 every 10 years	0
Net immigration	2	1	0	1 every 3 years
Net occupational shifts	0	0	0	0
Training output	1	0	0	0
Active/inactive	0	0	0	0
Attrition	1980 age distribution, retirement at 65	1980 age distribution, retirement at 65	0	1980 age distribution retirement at 65

3. NET MANPOWER REQUIREMENTS

3.1 GENERAL ASSUMPTIONS

3.1.1 Manpower Stock

The total number of podiatrists/chiropodists in Western Canada from 1970 to 1980 is shown in Table III.0.1, opposite. Currently there are approximately 60 foot care practitioners in the four Western Provinces, about 61% of which are located in British Columbia.

3.1.2 Factors Affecting Manpower Stock Supply

Table III.0.2, opposite, shows the assumptions made with respect to each of the factors which have the potential to affect stock, that is, migration, immigration, occupational shifts, training output, active to inactive movements and attrition. A discussion of each of these factors follows.

- Migration/Immigration

The historical and current supply of podiatrists and chiropodists in Western Canada has been totally dependent on the immigration of qualified practitioners and graduates from the United States and the United Kingdom, because of the lack of Canadian educational programs in these related disciplines. Frequently, Canadians have gone to accredited American Colleges of Podiatric Medicine or Schools of Chiropody in the United Kingdom to obtain their training, and have returned to their province of origin to practice. This supply has been enhanced by the immigration of non-Canadian podiatrists and chiropodists to Western Canada.

The United States has a shortage of podiatrists relative to its desired ratio of manpower to population. The incentive for American-trained Canadian podiatrists to immigrate back to Canada will likely be diminished in the future, by limitations in the allowed scope of practice, the lack of hospital priviledges, and the paucity of residency positions.

The immigration of chiropodists from the United Kingdom to Saskatchewan and Manitoba will continue to be limited in the future. There are economic barriers to the utilization of chiropodic services because of the lack of foot care benefits or insurance, and this restricts the number of chiropodists who can viably operate in independent practices. Chiropodic services are insured in the United Kingdom.

About 25 to 30 Canadians study in the American Schools of Podiatry at any one time. Of this number, 4 to 5 graduate per year, and 2 to 3 return to Canada to practice.[10] Most of the latter have historically located in Ontario. However, the present policy of the Ontario government to adopt the United Kingdom system of foot care delivery will encourage a greater proportion of returning Canadian podiatrists to locate in Alberta and British Columbia. Furthermore, the propensity of established Ontario podiatrists to migrate to Alberta and British Columbia may rise as a consequence of this policy. It is not possible to determine a priori, what the extent of the reaction may be.

10. British Columbia Association of Podiatrists. Meeting in August, 1980.

- Occupational Shifts

Ontario's pilot course in chiropody to train registered nurses will influence the potential for occupational shifts in the future. Shifts out of the chiropody profession into other occupations are occuring in Saskatchewan, ostensibly as a result of the lack of foot care benefits.11

- Active To Inactive Flows

There are few podiatrists and chiropodists in Western Canada from which the present supply of manpower could be augmented. The introduction of chiropody-trained registered nurses may affect the inactive supply at a later date, since nursing is predominantly a female profession. The activity status of the current stock is not yet an issue.

- Attrition From Death and Retirement

About 40% of the Western Canadian stock of podiatrists and chiropodists is older than 55, and is likely to retire before the end of the forecast period. (See provincial tables on age distribution of chiropodists and podiatrists in the following sections.) The forecast model used automatically retires from the active stock, all practitioners who turn 65. Part-time work subsequent to this age is not uncommon, but it is assumed to be balanced by early retirements.

11. Saskatchewan Association of Chiropodists. Comments of president, August, 1980.

TABLE III.0.3

PODIATRISTS/CHIROPODISTS: RATIOS OF MANPOWER TO POPULATION

COUNTRY OR PROVINCE	ACTUAL RATIO	TARGET RATIO
United States	1:27,340 (1978)[1]	1:15,000 - 1:24,000[5]
United Kingdom	1:12,800 (1973)[2]	No service target[6]
Canada	1:143,209 (1977)[3]	No service target
Ontario	1:95,433 (1978)[4]	1:20,000 - 1:30,000[7]

1. U.S. Office of Health Research and Statistics.
2. Ontario Council of Health, Proposed Scope of Practice of Chiropodists, 1973.
3. Manitoba Department of Health & Community Services. Health Manpower Provincial Report, 1979.
4. Ontario Health Manpower.
5. Leonard A. Levy. "The Potential of Podiatric Medicine In Comprehensive Health Care," Public Health Reports, Sept.-Oct. 1974, Vol. 89, No.5 p.451.
6. Manpower Intelligence Unit, Department of Health and Social Services, United Kingdom.
7. A Statement of Policy On The Delivery of Foot Care. Health Disciplines Committee, Ontario Ministry of Health, and communication with Director, Ontario Ministry of Health, Health Planning Program, August, 1980.

The stock of podiatrists and chiropodists in each province is too small to undertake meaningful estimates of mortality. The highest death probabilities coincide with the age group 65 and over, which, by the above assumption, has already been subtracted from the active stock.

3.1.3 Requirements

- Service target ratio

Table III.0.3, opposite, lists the service target ratios for the United States and the United Kingdom, relative to the actual ratios achieved. Canada's lack of foot care policy is reflected by its low ratio of foot care specialists to total population.

The United States appear to have a low number of podiatrists to population relative to the United Kingdom. However, the majority of American podiatrists employ podiatric assistants to deliver palliative foot services, but these are not included in the calculation of the manpower population ratios.

In the estimation of future needs for foot care personnel in Western Canada, three scenarios of care are examined:

- A chiropody service target of 1:20,000, the present targeted level of service in Ontario.

TABLE III.0.4

INCIDENCE OF FOOT AILMENTS

Age Groups	Percentage With Foot Ailments
Less than 01	1%
01	8%
02-05	41%
06-20	80%
21-64	80%
65+	90-95%

Source: G.A. Gorecki and T.P. Brzyski, "Podiatric Medicine: A New Threshold In Health Manpower," American Journal of Public Health, Nov. 1975, Vol. 65, No.11.

The incidence of foot ailments is highest among the elderly as indicated in the table above. A 1976 survey by the American Podiatry Association, indicates that women are more susceptible to foot problems than men. In addition, the lack of insured services in the United States creates economic barriers to proper foot care.[12]

12. American Podiatry Association, An Assessment of Foot Health Problems And Related health Manpower Utilization And Requirements, August 10, 1976.

- A chiropody service target of 1:30,000, reflecting a minimum standard of service that might be desired, and the existing level of service in the United States.

- A podiatry service target of 1:91,000 for British Columbia and Alberta, to reflect a two tier system where podiatrists confine their activities to specialized foot services.

It has been estimated that approximately 70% of all foot care services provided in Ontario are for basic palliative care. Therefore it can be assumed that 3% of a podiatrist's time is spent on specialized services requiring podiatric training.

If podiatrists in the United States were solely to perform specialized foot services, then the required number of this manpower would fall from the current level of 8,000, to about 2,400. This implies that only 1 podiatrist is required to service the specialized medical foot needs of a population of 91,000.

Table III.0.4, opposite, shows the incidence of foot ailments by age, for the United States.

Utilization

There is an increasing trend in the demand for foot care for a variety of reasons:

- an aging population which has a greater incidence of foot problems than other age groups.
- an increased number of persons afflicted with chronic diseases and systemic disorders manifested in the feet.
- increased shoe-related injuries.
- an increased number of nursing homes and extended care facilities.
- increased public knowledge of health and prevention of ill-health conditions.
- the desire to keep the general population ambulatory and the trend away from institutionalization.
- proper foot care is regarded as an essential service to faster mobility and independence among older persons, to prevent deterioration and premature death, and to prevent disability which causes social and economic dependence.

The level of utilization will increase as foot care services become insured. In Alberta and British Columbia, current rates of utilization are constrained by the number of manpower offering foot care services.

3.1.4 Productivity

- **Technology**

Advances in technology are unlikely to significantly affect the net requirement for foot care manpower, since palliative and surgical services are labour intensive.

- **Delegation Of Tasks**

The trend in the United States is for podiatrists to employ the services of podiatric assistants to perform palliative services. If the podiatric option is chosen, then there would be scope for the delegation of task from podiatrists to podiatric assistants or chiropodists.

Chiropodists often train registered nursing assistants to undertake many simple palliative foot functions. In Ontario, the government is training registered nursing assistants to perform all chiropodic services. The proper mix of chiropodists to registered nursing assistants is being examined in that province.

- **Mode Of Practice**

The 1970 American survey of podiatrists in the United States revealed that 81% of active podiatrists were in solo practice, 13% in partnership practice and the rest in group, education and hospitals. The non-solo practices resulted in the provision of about 20% more

services, and more patients seen. About 86% of all podiatrists in 1970 engaged in solo practice, therefore the overall contribution to total productivity is relatively minor. Trends toward group practice are not identified in the study.[14]

3.1.5 Sensitivity Analysis

Because of the problems encountered in this occupation, including the lack of defined services in two provinces, and the limited number of practitioners in the other provinces, we did not undertake any sensitivity analysis. However, the pattern of per capita service utilization was analysed. In British Columbia, the compound annual increase in per capita service utilization for the five year period, 1976 to 1980 has been 10.5%. The equivalent figure in Alberta for the nine year period, 1972 to 1980 has been an annual compound increase of 4.9%. We have been unable to determine whether this pattern of service utilization was constrained by the availability of practitioners.

14. Podiatry Manpower: Characteristics of Clinical Practice National Center for Health Statistics.

3.2 PROVINCIAL ASSUMPTIONS

3.2.1 BRITISH COLUMBIA

a) Legal Controls - The Podiatry Act of British Columbia defines the practice of podiatry as:

"the diagnosis and medical, surgical, mechanical, manipulative, and electrical treatment of the human foot including the nonsurgical treatment of muscles and tendons of the leg governing the functions of the foot or any combination of these practices or treatments, but does not include treatment of the foot that may affect the course of treatment of a systemic disease unless the treatment is carried out at the direction or under the supervision of a medical practitioner."

Surgery is restricted to minor surgery unless the treatment is performed in a hospital. As well, podiatrists are prohibited from using anaesthetics other than local anaesthetics. Only persons who hold a certificate of registration under the act are authorized to practice podiatry in British Columbia.

b) Insured Services

In 1980, the Medical Services Plan of British Columbia covered podiatric services, excluding x-rays within specified limits for individuals and families in any one year. The limits do not apply if the patient is referred by a medical practitioner. The fee schedule distinguishes between office, house and hospital visits, injections, surgical procedures, and manipulation and casting.

TABLE III.1.1

NUMBER OF PODIATRISTS

IN BRITISH COLUMBIA, 1971 to 1979

YEAR	MEDICAL SERVICES PLAN[1]	HEALTH MANPOWER RESEARCH UNIT	BRITISH COLUMBIA PODIATRY ASSOCIATION
1971	-	-	28
1972	-	-	30
1973	-	-	25
1974	-	-	28
1975	-	-	28
1976	37	-	33
1977	32	37	-
1978	36	-	-
1979	38	36	-

Notes: 1. The count from the Medical Services Plan includes registered podiatrists billing the plan during the fiscal year ending 1979.

2. The Health Manpower Research Unit count includes registered podiatrists with British Columbia addresses.

3. The British Columbia Podiatry Association defines practitioners as the number of podiatrists registered. The source is the Canada Manpower Inventory, 1978.

TABLE III.1.2

TOTAL NUMBER OF ACTIVE PODIATRISTS

REGISTERED IN BRITISH COLUMBIA BY AGE, 1980

AGE GROUP	NUMBER
Less than 30	1
30 - 34	14
35 - 39	7
40 - 44	2
45 - 49	0
50 - 54	2
55 - 59	8
60 and over	7
Total	41

Note: 1. The current age distribution of podiatrists was provided by the Registrar of the British Columbia Podiatry Association.

TABLE III.1.3

FACTORS AFFECTING MANPOWER SUPPLY

PODIATRY, BRITISH COLUMBIA

FACTOR	ASSUMPTION	SOURCE
Opening stock	41	BCPA records
Net migration	0	Interview with BCPA Executive
Net immigration	2	Interview with BCPA Executive
Net occupational shifts	0	Interview with BCPA Executive
Training output	1	BCPA records
Active to inactive	0	Interview with BCPA Executive
Attrition	1980 age distribution and retirement at 65	BCPA records

Note: BCPA is the British Columbia Podiatry Association

c) Assumptions

i Stock

. Historical stock 1971 to 1979 - The total number of podiatrists in British Columbia from 1971 to 1979 is shown in Table III.1.1, opposite. The count from the Health Manpower Research Unit includes registered podiatrists who reported a British Columbia office address whereas the British Columbia Podiatry Association includes all podiatrists registered with the association. The Medical Services Plan count includes registered podiatrists billing the plan during the fiscal year ending in 1979. The discrepancies in the counts result from the definitional differences. In the analysis of historical manpower stock, the data from the British Columbia Podiatry Association for 1971 to 1976 is used, as are the Health Manpower Research Unit figures for 1977 and 1979.

. Current stock 1980 - According to the Registrar of the British Columbia Podiatry Association, there are currently 41 podiatrists active in the province. The age distribution of the current stock is presented in Table III.1.2, opposite. All of the podiatrists are male.

ii Factors Affecting Manpower Supply

Table III.1.3, shows the assumptions made with respect to each of the factors which have the

potential to affect stock, that is, migration, immigration, occupational shifts, training output, active to inactive movements, and attrition. Each of these factors is discussed in more detail in the sections following.

. Net migration - Data specific to the inter-provincial migration of podiatrists is not available. However, the Executive to the BCPA indicated that very few active practitioners migrate between Canadian provinces. Within the last 10 years, only 1 practitioner from Alberta set up practice in British Columbia. During the same period, 1 or 2 individuals left British Columbia for Ontario. As a result, we have assumed the rate of net migration is zero over the forecast period.

. Net immigration - As there is no school of podiatry in Canada, British Columbia residents must take their podiatic training in the United States. The BCPA Executive indicated that 2 recent graduates from a United States School of Podiatry set up practice in British Columbia each year. This rate of net immigration is assumed to continue for 1981 to 2000.

. Net occupational shifts - The British Columbia Podiatry Act limits foot care to graduates of United States Schools of Podiatry thus precluding the use of related occupational groups such as chiropodists. As well, the BCPA Executive indicated that podiatrists do not leave the

profession prior to retirement. The factor is therefore assumed to be zero from 1981 to 2000.

. Training output - The Vancouver General Hospital has two graduate residency positions in podiatry. Historically, one of these graduates has set up practice in British Columbia. We have assumed the addition of 1 podiatrist per year from this source.

. Active to inactive flows - According to the Executive of the BCPA, there are no inactive podiatrists in British Columbia. While there are no female podiatrists in the province, the future stock of podiatrists may be affected by the age-sex distribution, if females establish practice in British Columbia, and if their labour force participation is less than that of males.

. Attrition from death and retirement - The 1980 age distribution of active podiatrists provided by the Registrar of the BCPA was used to determine retirements from 1981 to 2000. We have assumed that podiatrists retire at 65. Due to the high joint probability of death and retirement and the small size of the occupational group, we have not made separate estimates of attrition from death.

iii Requirements

. Historical population ratio - The 1980 ratio of podiatrists to British Columbia population of 1:63,978 was applied against projected population

TABLE III.1.4

TOTAL PAYMENTS FOR PODIATRIC SERVICES BY

AGE AND SEX OF PATIENT, BRITISH COLUMBIA, 1980

AGE GROUP	MALE	FEMALE	
	$	$	
Under 1	435	788	
1 - 4	5,431	5,128	
5 - 14	15,473	16,760	
15 - 24	21,180	42,581	
25 - 44	118,665	178,121	
45 - 64	134,659	400,311	
65 - 74	112,893	273,623	
Over 74	110,315	262,932	
Total	519,051	1,180,244	$1,699,295
Unknown			798,027
Total			$2,497,322

Note: 1. The data was provided by the Medical Service Plan, Ministry of Health. As service counts were considered unreliable, payment data was used. The payment data is based on date of payment, not date of service.

TABLE III.1.5

TRENDS IN PER CAPITA UTILIZATION

OF PODIATRIC SERVICES IN BRITISH COLUMBIA

YEAR	PAYMENT IN CURRENT $	PAYMENT IN 1976 $	POPULATION	PAYMENT IN $/POPULATION
1976	1,218,709	$1,219.00	2,476.1	$.49
1977	1,568,140	$1,452.00	2,506.4	$.58
1978	1,763,112	$1,540.00	2,545.3	$.61
1979	2,155,797	$1,780.00	2,591.8	$.69
1980	2,497,322	$1,924.00	2,626.4	$.73

Note: 1. Compound annual increase of 10.5% in per capita payments in 1976 $.

to determine the size of the stock required to maintain the current service level over time.

. Utilization - Table III.1.4, opposite, shows total payments for podiatric services by age and sex of patient, under the Medical Services Plan in 1980. These were used to develop specific age-sex utilization rates. These rates were applied to age-sex population forecasts and manpower requirements were then projected assuming a constant payment per practitioner. Table III.1.5, opposite, shows the trends in per capita service utilization of foot care services.

. Service target ratio - Requirements were projected using a service target ratio of chiropodists to population of 1:20,000 and 1:30,000, to reflect a two tier system of care. In addition, we project manpower requirements for podiatrists on a ratio of 1:91,000.

d) Net Requirements

Tables III.1.6, and III.1.7, opposite, show the net manpower requirements (incremental and cumulative) for podiatry and chiropody in British Columbia.

. Highlights - The manpower requirements are based on the medium population scenario.

TABLE III.1.6

NET REQUIREMENTS, BRITISH COLUMBIA, CHIROPODY/PODIATRY

(Incremental and Cumulative)

YEAR	Low Population Scenario						Medium Population Scenario						High Population Scenario					
	LOW		MEDIUM		HIGH		LOW		MEDIUM		HIGH		LOW		MEDIUM		HIGH	
	A	A	B	B	C	C	A	A	B	B	C	C	A	A	B	B	C	C
1981	-1	-1	88	88	133	133	0	0	89	89	134	134	0	0	90	90	135	135
1982	0	-1	2	90	2	135	0	0	2	91	2	136	0	0	2	92	3	138
1983	-1	-2	1	91	2	137	-1	-1	2	93	3	139	-1	-1	2	94	3	141
1984	-2	-4	2	93	2	139	-2	-3	2	95	3	142	-1	-2	2	96	3	146
1985	-1	-5	1	94	2	141	-1	-4	2	97	3	145	-1	-3	2	98	3	147
1990	-4	-9	7	101	11	152	-2	-6	9	106	13	158	-2	-5	11	109	16	163
1995	-10	-19	6	107	9	161	-10	-16	8	114	13	171	-8	-14	9	118	14	177
2000	-12	-31	6	113	8	169	-11	-27	7	121	10	181	-10	-24	9	127	14	191

Requirements derived using:

A. Historical ratio approach of 1:63,978 podiatrists achieved in 1980
B. Service target ratio approach of 1:30,000 chiropodists
C. Service target ratio approach of 1:20,000 chiropodists

TABLE III.1.7

NET MANPOWER REQUIREMENT - PODIATRISTS

BRITISH COLUMBIA, CALCULATED AT RATIO 1:91,000

YEAR	Low Population Scenario		Medium Population Scenario		High Population Scenario	
	Incremental	Cumulative	Incremental	Cumulative	Incremental	Cumulative
1981	-13	-13	-13	-13	-12	-12
1982	0	-13	0	-13	-1	-13
1983	-2	-15	-1	-14	-1	-14
1984	-1	-16	-2	-16	-1	-15
1985	-2	-18	-1	-17	-2	-17
1990	-5	-23	-4	-21	-3	-20
1995	-11	-34	-11	-32	-10	-30
2000	-13	-47	-12	-44	-12	-42

A) Podiatry

Based on the current population ratio, there is a surplus of 31 podiatrists in the year 2000. (Table III.1.6) Under the service target ratio of 1:91,000, there is a surplus of 44 podiatrists in the year 2000. (Table III.1.7)

B) Chiropody

Under the service target ratio of 1:30,000 population, there is a requirement for 121 chiropodists by the year 2000.

Under the service target ratio of 1:20,000 population, there is a requirement for 181 chiropodists by the year 2000.

3.2.2. ALBERTA

a) Legal Controls - The Podiatry Act of Alberta defines podiatry as:

"the branch of healing arts that treats ailments, disease conditions, deformities or injuries of the human foot and the leg muscles controlling the foot and includes the examination, diagnosis, treatment of such ailments, conditions, deformities or injuries but does not include the treatment of systemic diseases of bones, muscles or ligaments or the use of x-ray equipment for purposes other than diagnostic, or the use of anaesthetics other than local."

Only persons who have a certificate of registration issued by the Alberta Podiatry Association are entitled to practice. Besides meeting educational and professional standards, each person admitted to membership must be 21 years of age.

b) Insured Services

Podiatric services are included by the Alberta Health Care Insurance Plan. Services covered are within specified limits for families and individual, for examination, treatment, consultations, and minor surgery for foot disorders as well as the fitting and dispensing of orthopaedic appliances. The limits are increased occassionally to take account of the impact of inflation.

TABLE III.2.1

TOTAL NUMBER OF PODIATRISTS,

IN ALBERTA, 1970 to 1979

YEAR	ALBERTA HEALTH CARE INSURANCE PLAN[1]	ALBERTA SOCIAL SERVICES AND COMMUNITY HEALTH[2]	ALBERTA PODIATRY ASSOCIATION
1970	7	-	-
1971	8	-	8
1972	12	-	9
1973	11	-	11
1974	11	-	11
1975	12	-	13
1976	14	13	13
1977	15	12	13
1978	15	13	14
1979	14	13	14

Notes: 1. The count from the Alberta Health Care Insurance Plan includes podiatrists resident in the province who billed the plan in the fiscal year. The data was compiled from annual reports of the plan.

2. The Alberta Social Services and Community Health count defines stock as the number of active members who are registered with the Alberta Podiatry Association. The source is the Report of Health and Social Services Manpower in Alberta, 1979.

3. The Alberta Podiatry Association count includes all podiatrists with active registrations. The source is the Canada Manpower Inventory 1978 supplemented by interview data from the association.

TABLE III.2.2

TOTAL NUMBER OF ACTIVE PODIATRISTS

REGISTERED IN ALBERTA, BY AGE, 1980

AGE GROUP	NUMBER
Less than 30	1
30 - 34	0
35 - 39	7
40 - 44	0
45 - 49	2
50 - 54	0
55 - 59	2
60 and over	3
Total	15

Source: The Registrar of the Alberta Podiatry Association provided us with the estimated age distribution of the total number of active podiatrists.

TABLE III.2.3

FACTORS AFFECTING MANPOWER SUPPLY

ALBERTA PODIATRY

FACTOR	ASSUMPTION	SOURCE[1]
Opening stock	15	President APA
Net migration	0 each year	President APA
Net immigration	1 each year	President APA
Net occupational shifts	0 each year	President APA
Training output	0 each year	No training programs in Canada
Active to inactive flows	0 each year	President APA
Attrition	Estimated age distribution and retirement at 65	Registrar APA

Note: 1. APA is the Alberta Podiatry Association

Assumptions

i Stock

. Historical stock 1970 to 1979 - The total number of podiatrists in Alberta from 1970 to 1979 is shown in Table III.2.1, opposite. The count from the Alberta Health Care Insurance Plan includes podiatrists resident in the province, who billed the plan during the fiscal year, while the Alberta Social Services and Community Health count and the Alberta Podiatry Association counts define stock as the number of registered podiatrists active in the province. The discrepancies in the count are the result of the definitional differences. In the analysis of historical manpower stock, we have used the data from the Alberta Podiatry Association.

. Current stock 1980 - According to the Registrar of the Alberta Podiatry Association, there are currently 15 podiatrists active in the province. The estimated age distribution of the current stock is presented in Table III.2.2, opposite. All of the podiatrists are male.

ii Factors Affecting Manpower Supply

Table III.2.3, shows the assumptions made with respect to each of the factors which have the potential to affect stock, that is, migration,

immigration, occupational shifts, training output, active to inactive movements, and attrition. Each of the factors is discussed in more detail in the sections following.

. Net migration - Data specific to the inter-provincial migration of podiatrists is not available. However, the President of the APA indicated that only 1 podiatrist has left Alberta in the last 10 years to practice elsewhere in Canada, and only 1 practitioner from Ontario has relocated to Alberta during this period. Consequently, we have assumed a net migration value of zero over the forecast period.

. Net immigration - As there is no school of podiatry in Canada, the APA supports Alberta residents taking podiatry training in the United States. Currently, 5 students from Alberta are enrolled in the United States Schools of Podiatry. The Executive expects that 75% of the students will return to Alberta. Consequently, we have assumed the net immigration rate of 1 person per year will continue over the forecast period.

. Net occupational shifts - The Alberta Podiatry Act, which limits foot care to graduates of the United States Schools of Podiatry, precludes the use of related occupational groups such as chiropodists. As well, the APA President indicated that no podiatrists to the best of his memory have left the profession prior to retirement. The net occupation shift factor is

therefore assumed to be zero from 1981 to 2000.

. Training output - The Province of Alberta does not offer a training program in podiatry, nor does it reserve places for Alberta residents at schools of podiatry in other countries through contractual arrangements. Training output is therefore assigned a value of zero for the forecast period.

. Active to inactive flows - According to the President of the APA, there are no inactive podiatrists in Alberta. In fact, all the podiatrists are currently working full-time. However, a few may switch to part-time practice as they near retirement.

The future stock of podiatrists may be affected, if females establish practice in Alberta, and if their labour force participation rate is less than that of males. However, presently there are no female podiatrists in the province. For these reasons, the value for active to inactive flows is assigned to zero over the forecast period.

. Attrition from death and retirement - The 1980 estimated age distribution of active podiatrists provided by the Registrar of the APA was used to determine retirements from 1981 to 2000. We have assumed that podiatrists retire at 65. Due to the high joint probability of death and retirement and

TABLE III.2.4

TOTAL NUMBER OF PODIATRIC SERVICES

BY AGE AND SEX OF PATIENT, ALBERTA, 1979 to 1980

	1979	1980
MALE		
Under 1	3	2
1 - 4 years	256	338
5 - 14	912	980
15 - 24	1,207	1,204
25 - 44	3,133	3,497
45 - 64	5,399	5,390
65 and over	9,166	9,872
FEMALE		
Under 1	5	4
1 - 4 years	238	221
5 - 14	1,096	894
15 - 24	2,230	2,369
25 - 44	6,328	7,332
45 - 64	16,707	16,985
65 and over	27,504	29,825
Grand Total	54,108	57,630

Source: Alberta Health Care Insurance Plan

TABLE III.2.5

TRENDS IN PER CAPITA UTILIZATION

OF PODIATRIC SERVICES IN ALBERTA

YEAR	SERVICES	POPULATION (000)	SERVICES/POPULATION
1972	43,640	1,670.6	.026
1973	53,058	1,702.6	.031
1974	56,815	1,741.4	.033
1975	59,761	1,799.0	.033
1976	66,193	1,866.7	.036
1977	69,709	1,919.1	.036
1978	67,391	1,976.1	.034
1979	74,424	2,034.7	.037
1980	78,813	2,068.8	.038

Notes: 1. 4.9% compound increase in per capita services.

the small size of the occupational group, we have not made separate estimates of attrition from death.

iii Requirements

. Historical population ratio - The 1980 ratio of podiatrists to Alberta population of 1:148,729 was applied against projected population to determine the size of the stock required to maintain the current service level over time.

. Utilization - The total number of podiatric services by patient age and sex for 1979 and 1980 was obtained from the Alberta Health Care Insurance Plan and is presented in Table III.2.4, opposite. The average number of podiatric services provided to each age-sex grouping for 1979 and 1980 was used to develop specific utilization rates. The rates were applied to the age-sex population forecasts and manpower requirements were then projected assuming podiatric services per practitioner.

Table III.2.5, opposite, shows the trend in per capita service usage of foot care services in Alberta.

. Service target ratio - Requirements were projected for a service target ratio of chiropodists to population of 1:20,000 and of 1:30,000, based on a two tier system of foot care. In addition, we projected manpower requirements for podiatrists on a ratio of 1:91,000.

TABLE III.2.6

NET REQUIREMENTS, ALBERTA, PODIATRY/CHIROPODY

(Incremental and Cumulative)

YEAR	Low Population Scenario						Medium Population Scenario						High Population Scenario					
	LOW		MEDIUM		HIGH		LOW		MEDIUM		HIGH		LOW		MEDIUM		HIGH	
	A	A	B	B	C	C	A	A	B	B	C	C	A	A	B	B	C	C
1981	0	0	71	71	106	106	1	1	72	72	108	108	1	1	72	72	109	109
1982	0	0	2	73	3	109	-1	0	3	75	4	112	-1	0	3	75	3	112
1983	0	0	1	74	3	112	1	1	3	78	4	116	1	1	2	77	4	116
1984	-1	-1	2	76	2	114	-1	0	2	80	4	120	-1	0	3	80	4	120
1985	1	0	2	78	3	117	1	1	3	83	4	124	1	1	3	83	4	124
1990	-2	-2	7	85	11	128	-1	0	11	94	17	141	0	1	14	97	22	146
1995	-3	-5	7	92	10	138	-2	-2	11	105	17	158	-2	-1	15	112	22	168
2000	-2	-7	7	99	10	148	-1	3	11	116	16	174	0	-1	12	127	22	190

Requirements derived using:

A. Historical ratio approach of 1:138,800 for podiatrists
B. Service target ratio approach of 1:30,000 for chiropodists
C. Service target ratio approach of 1:20,000 for chiropodists

TABLE III.2.7

NET MANPOWER REQUIREMENT - PODIATRISTS, ALBERTA

CALCULATED AT RATIO 1:91,000

YEAR	Low Population Scenario		Medium Population Scenario		High Population Scenario	
	Incremental	Cumulative	Incremental	Cumulative	Incremental	Cumulative
1981	8	8	9	9	9	9
1982	0	8	0	9	0	9
1983	1	9	1	10	1	10
1984	-1	8	-1	9	-1	9
1985	1	9	1	10	1	10
1990	-1	8	1	11	2	12
1995	-3	5	-1	10	0	12
2000	0	5	0	10	2	14

d) Net Requirements

Table III.2.6, opposite, shows the net manpower requirements (incremental and cumulative) for podiatry and chiropody.

. Highlights

The manpower requirements are based on the medium population projection, and reflect a two tier system of podiatry and chiropody, where podiatrists perform only specialized medical foot services.

A) Podiatry

Based on the current population ratio, there is a surplus of 3 podiatrists in the year 2000. Under a service target ratio of 1:91,000, there is a requirement for 10 additional podiatrists by the year 2000. Table III.2.7, opposite, shows the net manpower requirements for this service target ratio for podiatrists.

B) Chiropody

Under the service target ratio of 1:30,000 population, there is a requirement for 116 chiropodists by the year 2000.

Under the service target ratio of 1:20,000 population, there is a requirement for 174 chiropodists by the year 2000 in Alberta.

3.2.3. SASKATCHEWAN

a) Legal Controls - The Chiropody Profession Act of Saskatchewan restricts the practice of chiropody to the treatment:

"of ailments or diseased conditions or deformities or injuries of the human foot, and includes examining or diagnosing or prescribing for or treating such disabilities, and massage or adjustment in connection therewith.

Chiropodists in Saskatchewan are allowed to undertake minor surgery involving nails and skin for palliative purposes, but cannot perform corrective surgery involving muscles, tendons and bones. Podiatrists who practice in Saskatchewan are confined to the same scope of practice as chiropodists. Neither profession has hospital admitting privileges.

The Council of the Saskatchewan Association of Chiropodists (hereinafter SAC) is empowered by the Act to administer its regulations with respect to registration, examinations, discipline and complaints.

b) Insured Services

Foot care services provided by chiropodists or podiatrists are not presently insured in Saskatchewan. However, the provision of foot care health benefits, especially for senior citizens, is a stated priority of the present Saskatchewan government. The decision to provide foot care health benefits will depend upon:

TABLE III.3.1

TOTAL NUMBER OF CHIROPODISTS AND PODIATRISTS IN SASKATCHEWAN BY ORIGIN OF TRAINING, BY ACTIVITY STATUS, AS OF SEPTEMBER 30, 1980

YEAR	TOTAL NUMBER OF MANPOWER			PLACE OF TRAINING	
	ACTIVE	INACTIVE[1]	TOTAL	UNITED STATES	UNITED KINGDOM
1970	2	2	4	4	0
1971	2	0	2	2	0
1972	2	0	2	2	0
1973	2	1	3	2	1
1974	2	1	3	2	1
1975	3	4	7	2	5
1976	7	4	11	2	9
1977	3	6	9	1	8
1978	3	6	9	1	8
1979	2	7	9	1	8
1980	3	4	7	1	6

Source: Saskatchewan Association of Chiropodists. Correspondence with President, September, 1980. Telephone conversation, October, 1980.

Notes: 1. Inactive is defined as less than three working days per week in service to patients.

- the results of the current evaluation by Saskatchewan Health of chiropodic services provided at the Saskatoon Community Health Clinic, with respect to professional interaction with other medical practitioners, effectiveness of prescribed treatment, patient characteristics and need, and projected costs.

- the ability to make satisfactory arrangements for the training of chiropodists required in Saskatchewan.

- the ability to phase in benefits either by geographic region, by specific age group or by institutionalized group.

- the availability of public revenues to finance the provision of services, and the training of chiropodists.

c) Assumptions

i Stock

- Historical stock 1970 to 1980 - The total number of active and inactive chiropodists and podiatrists practicing in Saskatchewan from 1970 to 1980 is shown in Table III.3.1 opposite. The data were provided by the SAC, and indicate the place of training of the historical manpower.

TABLE III.3.2

AGE AND SEX DISTRIBUTION OF CHIROPODISTS AND PODIATRISTS IN SASKATCHEWAN BY NATIONALITY AND ACTIVITY STATUS, 1980

AGE GROUP	MALE	FEMALE	TOTAL[1]	CANADIAN	BRITISH SUBJECT
Less than 20	0	0	0	0	0
20 - 29	3	0	3	2	1
30 - 39	1	1	2	0	2
40 - 49	1	1	2	1	1
50 - 59	1	0	1	1	0
60 and over	0	0	0	0	0
Total	6	2	8	4	4

Source: Saskatchewan Association of Chiropodists. Correspondence September 30, 1980.

Note: 1. The total includes one chiropodist who left Saskatchewan in 1980.

TABLE III.3.3

FACTORS AFFECTING MANPOWER SUPPLY

PODIATRISTS/CHIROPODISTS, SASKATCHEWAN

FACTOR	ASSUMPTION	SOURCE
Stock	3	S.A.C.
Net migration	-1 every ten years	S.A.C.
Net immigration	0	S.A.C.
Net occupational shifts	0	S.A.C.
Training output	0	S.A.C.
Active/inactive	0	S.A.C.
Attrition	0	S.A.C.

Note: S.A.C. is the Saskatchewan Association of Chiropodists

. Current stock 1980 - The age-sex distribution of chiropodists and podiatrists, as well as their nationality is shown on Table III.3.2, opposite.

ii Factors Affecting Manpower Supply

Table III.3.3, opposite, shows the assumptions made with respect to each of the factors which have the potential to affect stock, that is, migration, immigration, occupational shifts, training output, active/inactive flows and attrition.

. Net migration - The SAC president indicated that there have been no requests by chiropodists and podiatrists in other Canadian provinces to move to Saskatchewan, nor have there been any deliberate movements other than through spouses accompanying mates. The SAC reports no increase of the active stock from the latter phenomenon. Out-migration has occurred at the rate of 1 every 10 years. This same rate is assumed for the entire forecast period.

. Net immigration - The SAC records of immigration show a net increase of 3 chiropodists over the period 1970 to 1980. However, since 1976 there have been no immigrants, while one chiropodist has actually returned to the United Kingdom. The SAC president suggests that this trend will likely continue, unless foot care benefits are introduced. The value for net

immigration was assigned a value of zero for 1981 to 2000 on the basis of this information.

. Net occupational shifts - There is scope for registered nurses or nursing assistants to be trained to undertake foot care services, but no information exists regarding the extent of this practice in Saskatchewan. The four inactive chiropodists are considered to have shifted to other occupations. If foot care benefits were introduced, it is likely that these chiropodists would shift back into the profession. The occupation shift factor is assigned a value of zero for the forecast period, and assumes no shifts back into the profession under the current situation.

. Training output - There are presently no chiropody training programs in Canada, hence this factor is assigned a value of zero to the year 2000.

. Active To inactive flows - As of October 1980, there was one part-time chiropodist working two days per week in Regina, according to the SAC president. A value of zero is assigned to the

forecast factor, on the assumption that the present situation will not change.

. Attrition from death and retirement - In view of the small number of active chiropodists, no attempt was made to determine future attrition from retirements and deaths.

iii Requirements

. Historical population ratio - This method of estimating requirements was not attempted. The Saskatchewan Government's stated intention to provide a foot care program in the 1980's, recognizes that the present level of chiropody services is inadequate, relative to other Canadian provinces, the United States and the United Kingdom. In light of this, the historical ratio approach has no explanatory value.

. Utilization - The utilization approach was not attempted due to the lack of information on the total number of chiropodic services provided in Saskatchewan.

. Service target ratio - Three possible service target ratio levels were examined, that is, 1:15,000, 1:20,000 and 1:30,000. Under our assumed two tier system, specialized foot services in Saskatchewan could be provided either by medical practitioners or podiatrists. However,

TABLE III.3.4

NET REQUIREMENTS, SASKATCHEWAN, CHIROPODY/PODIATRY

(Incremental and Cumulative)

YEAR	Low Population Scenario						Medium Population Scenario						High Population Scenario					
	LOW		MEDIUM		HIGH		LOW		MEDIUM		HIGH		LOW		MEDIUM		HIGH	
	A	A	B	B	C	C	A	A	B	B	C	C	A	A	B	B	C	C
1981	29	29	46	46	62	62	30	30	46	46	62	62	31	31	47	47	64	64
1982	1	30	0	46	1	63	0	30	1	47	1	63	0	31	1	48	1	65
1983	0	30	1	47	0	63	1	31	0	47	1	64	1	32	1	49	2	67
1984	0	30	0	47	1	64	0	31	1	48	1	65	1	33	1	50	1	69
1985	1	32	1	49	1	66	1	33	1	50	1	67	0	33	1	51	1	69
1990	0	31	1	49	1	66	1	33	2	57	4	70	3	36	5	56	7	76
1995	1	32	1	50	2	68	2	35	4	55	4	74	4	40	5	61	7	83
2000	1	33	1	51	2	70	2	37	2	57	4	78	3	43	6	67	8	91

Requirements derived using:

A. Service target ratio approach of 1:30,000
B. Service target ratio approach of 1:20,000
C. Service target ratio approach of 1:15,000

since podiatrists are only recognized for the palliative foot services they perform, it is unlikely that this occupation's role will be extended in the future. No projections of required podiatrists have been undertaken on this basis.

d) Net Requirements

Table III.3.4, opposite, shows the net manpower requirements (incremental and cumulative) for chiropody.

. Highlights

Based on the medium population scenario, under the service target ratio of 1:30,000 population, there is a requirement for 37 chiropodists in the year 2000.

Under the service target ratio of 1:20,000 population, there is a requirement for 57 chiropodists in the year 2000.

3.2.4. MANITOBA

a) Legal Controls - An Act Respecting Chiropody defines a chiropodist as a person:

"who practices, or advertises or holds himself out in any way as practicing chiropody and massage."

The practice of chiropody in the Province of Manitoba does not include: the amputation of, or treatment of injuries to, or infection of the foot, toes, hands or fingers, or manicuring the hands; or the use of anaesthetic except as a spray; or the use of drugs or medicines other than local antiseptics.

Membership in the Association of Chiropodists Manitoba (hereinafter ACM) is subject to successful completion of the examinations set by the examiner and established by the association. Each applicant for examination shall show evidence of good accredited and a diploma of graduation from a chartered school, college or university recognized by the ACM.

b) Insured Services

Services provided by chiropodists and podiatrists are not covered under the Manitoba Health Services Commission.

TABLE III.4.1

TOTAL NUMBER OF PODIATRISTS/

CHIROPODISTS IN MANITOBA, 1970 to 1979

YEAR	ASSOCIATION OF CHIROPODISTS MANITOBA[1]	MANITOBA, DEPARTMENT OF HEALTH & COMMUNITY SERVICES-RESEARCH SECTION[2]
1970	8	-
1971	8	-
1972	7	-
1973	7	6
1974	8	6
1975	8	7
1976	8	7
1977	7	7
1978	7	7
1979	7	7

Sources: 1. Association of Chiropodists - Manitoba, September 1980
2. Health Manpower Provincial Report, Manitoba 1980 pg. 215, 216.

TABLE III.4.2

TOTAL NUMBER OF ACTIVE RESIDENT CHIROPODISTS

BY AGE AND SEX, 1980, MANITOBA

AGE GROUP	MALE	FEMALE	TOTAL
Less than 20	-	-	-
20 - 24	-	1	1
25 - 29	-	-	-
30 - 34	1	1	2
35 - 39	-	-	-
40 - 44	-	-	-
45 - 49	-	1	1
50 - 54	-	1	1
55 - 59	-	-	-
60 - 64	2	-	2
65 and over	1	-	1
Total	4	4	8

TABLE III.4.3

FACTORS AFFECTING MANPOWER SUPPLY

PODIATRIST/CHIROPODISTS, MANITOBA

FACTOR	ASSUMPTION	SOURCE
Stock	8	A.C.M.
Net migration	0 every year	A.C.M.
Net immigration	1 every 3 years	A.C.M.
Net occupational shifts	0 every year	A.C.M.
Training output	0 every year	A.C.M.
Active/inactive	0 every year	A.C.M.
Attrition	Retirement at 65, based on 1980 age distribution	A.C.M.

Note: A.C.M. is the Association of Chiropodists - Manitoba

c) Assumptions

i Stock

· Historical stock 1970 to 1979 - The total number of active and inactive chiropodists and podiatrists practicing in Manitoba from 1970 to 1979 is shown in Table III.4.1, opposite. The data was provided by the Association of Chiropodists Manitoba.

· Current stock 1980 - The age/sex distribution of chiropodists and podiatrists is shown in Table III.4.2, opposite.

ii Factors Affecting Manpower Supply

Table III.4.3, opposite, shows the assumptions made for each of the factors which have the potential to affect stock, that is, migration, immigration, occupational shifts, training output, active to inactive flows, and attrition.

· Net migration - The president of the A.C.M. indicated that there have been no requests by chiropodists or podiatrists in other Canadian provinces to move to Manitoba. Out-of-province migration has historically been limited, and no practitioners have left the province in the time period under review. Thus, zero migration was assumed during the period.

. Net immigration - The records of the A.C.M. indicated a net increase of three practitioners from immigration for the period 1970 to 1980. The president of A.C.M. indicated that this limited immigration would likely continue, particularly in the absence of formalized training programs. The net immigration factor was thus assigned a net value of 1 every three years for the period 1981 to 2000.

. Net occupational shifts - Although it has been suggested that registered nurses or nursing assistants could be trained to provide a basic level of foot care in Manitoba, no formal program has been developed, and no plans have yet been developed for the provision of foot care. The factor for occupational shift has been assigned a value of zero for the forecast period under review for this reason.

. Training output - There are currently no chiropody training programs in Canada, and this factor has been assigned a value of zero for 1980 to 2000.

. Active to inactive flows - According to A.C.M. records there are currently no inactive chiropodists in the province. A value of zero has therefore been assigned to this factor.

TABLE III.4.4

NET REQUIREMENTS, MANITOBA, CHIROPODY/PODIATRY

(Incremental and Cumulative)

YEAR	Low Population Scenario						Medium Population Scenario						High Population Scenario					
	LOW		MEDIUM		HIGH		LOW		MEDIUM		HIGH		LOW		MEDIUM		HIGH	
	A	A	B	B	C	C	A	A	B	B	C	C	A	A	B	B	C	C
1981	0	0	27	27	45	45	1	0	27	27	45	45	0	0	27	27	45	45
1982	1	1	1	28	1	46	1	1	2	29	1	46	1	1	2	29	2	47
1983	1	2	2	30	1	47	1	2	1	30	2	48	1	2	1	30	1	48
1984	-1	1	-1	29	0	47	-1	1	-1	29	-1	47	-1	1	-1	29	-1	47
1985	0	1	0	29	0	47	0	1	0	29	0	47	0	1	0	29	1	48
1990	-2	-1	-1	28	0	47	-1	0	-1	28	0	47	-1	0	0	29	0	48
1995	1	0	1	29	1	48	0	0	2	30	2	49	0	0	1	30	2	50
2000	-1	-1	0	29	0	48	-1	-1	-1	29	0	49	-1	-1	0	30	1	51

Requirements derived using:

A. Historical ratio approach of 1:131,800 achieved in 1980
B. Service target ratio approach of 1:30,000
C. Service target ratio approach of 1:20,000

. Attrition from death and retirement - The figures assumed for death and retirement are based on the age distribution of active practitioners, as supplied by the A.C.M.

iii Requirements

. Historical population ratio - The requirement for chiropodists was projected at the current ratio of 1:131,800, which represents both the current, and the highest ratio of practitioner to population.

. Utilization - The utilization approach was not attempted due to the lack of information on the total number of chiropodic services provided in Manitoba.

. Service target ratio - Two possible service target ratio levels were examined, that is, 1:15,000, 1:20,000, and 1:30,000. Under the assumed two tier system of foot care, specialized services in Manitoba could be provided either by medical practitioners or podiatrists. However, the present role of podiatrists in Manitoba is limited to basic foot care, and is unlikely to be extended in the future. Because of this, no projection of required podiatrists was undertaken.

d) Net Requirements

Table III.4.4, opposite, shows the net manpower

requirements (incremental and cumulative) for chiropody.

· Highlights

Based on the medium population scenario, under the service target ratio of 1:30,000 population, there is a requirement for 29 chiropodists by the year 2000.

Under the service target ratio of 1:20,000 population, there is a requirement for 49 chiropodists by the year 2000.

4.0 TRAINING RECOMMENDATIONS

4.1 Introduction

In this section of the report, altenatives for training locations and funding arrangements for podiatrists and chiropodists in Western Canada are reviewed, using the decision process outlined in Section 1.3, above. This process follows a series of steps in a logical process, and these are discussed below.

Essentially, the manpower training requirements for podiatry and chiropody are considered under three alternatives:

- continuation of status quo
- a two tier foot care system, with a ratio of chiropodists to population of 1:30,000
- a two tier foot care system, with a ratio of chiropodists to population of 1:20,000

4.2 Step 1 - Analysis of Net Manpower Requirements

Under the status quo, there is an indicated surplus of practitioners in British Columbia and Alberta. No projection was made for Saskatchewan and Manitoba for this scenario.

Under a two tier system, a ratio of 1:91,000 podiatrists leads to a surplus of 34 podiatrists by the year 2000. A manpower population ratio of 1:30,000 for chiropody, yields a requirement for 300 chiropodists by the year 2000. The 1:20,000 ratio for chiropody implies a higher requirement for chiropodists of 460 by the year 2000.

4.2 Step 2 - Determine The Indicated Training Response

There are no formal college-based training programs for either podiatrists or chiropodists in Western Canada. This limits the potential training responses for both occupations. Each is discussed separately.

Podiatry

For each alternative presented, there is a surplus projected in the year 2000. This indicates that no college-based training program in podiatry should be established in Western Canada.

Chiropody

The training options based on the manpower requirements are made more difficult, by the size of the net requirement. A training program for chiropodists in Western Canada is only justified if all the western provinces adopt a compatible approach. To date, however, only the province of Saskatchewan has a defined policy to provide foot care services to its' population, but no definite program plan or time scale has yet been developed.

TABLE 1: Community Colleges With Basic Registered Nurse Training Program - British Columbia And Alberta

BRITISH COLUMBIA	ALBERTA
. Cariboo College	. Grant MacEwan Community College
. Okanagan College	. Medicine Hat College
. British Columbia Institute of Technology	. Mount Royal College
. Douglas College	. Red Deer College
. Selkirk College	. Lethbridge Community College
. Vancouver Community College (Langara Campus)	
. Camosun College	
. College of New Caledonia	

Note: These colleges form the potential sites for the recommended location for a training program in Chiropody.

TABLE 2: Program Cost Based on Proportion of Training Places Allocated To Each Province (1985 - 1998 Intakes)

	Annual Intake[1]	% of Program Cost
British Columbia	12	40.0%
Alberta	11	36.7%
Saskatchewan	4	13.3%
Manitoba	3	10.0%

Notes: 1. Estimated annual intake based on program start up date of 1985 to produce required manpower by year 2000.

Under the ratio of 1:30,000, Saskatchewan has a requirement for 37 chiropodists in the year 2000. This requirement could be met by entering into a contractual training arrangement with the Province of Ontario for places in the proposed program at George Brown College.

The potential training responses in Western Canada are limited, since there is no inactive labour force to consider in chiropody, and the potential to use nursing personnel to provide foot care has not been reviewed. (The supply and requirement for nursing personnel will not be determined until the fourth category in this study). Thus, the only potential training option at this time, is to develop an introductory skills program in chiropody.

If all the Western Provinces adopt a chiropody-based foot care program at a ratio of 1:30,000, then one training program with an annual intake of 30 students would satisfy the manpower requirements based on a program start date of 1985. A ratio of 1:20,000 would necessitate in a program intake of 50. The anticipated structure of such a program would be a three year technician program at the community college level.

4.3 Step 3 - Identify Potential Location

It has been suggested that training programs in chiropody should be located in colleges which currently offer basic registered nurse training programs. The majority of the manpower are required in either British Columbia or Alberta. The collges with basic registered nurse training programs in British Columbia and Alberta are shown in Table 1, opposite.

Because this program represented a new program, no attempt has been made to complete steps 4 and 6 in the decision process.

4.4 Step 4 - Establish Timing and Duration

The program start-up data will be dependent on policy decisions at the provincial and regional level. Given the size of the projected manpower requirement and the potential for attrition, it is anticipated that the program will continue until at least 2000. The initial training agreement should be for a minimum period of five years.

4.5 Step 5 - Recommended Finding Arrangements

All program costs (program development, start-up costs and capital costs, and the ongoing operational and administrative overhead costs) should be allocated to each province on the basis of the proportion of training places allocated to each province. Table 2, opposite, shows the projected annual intake figures, and the pecentage of program costs allocated to each province. On this basis, British Columbia should bear 40.0% of program costs, Alberta 36.7%, Saskatchewan 13.3%, and Manitoba 10.0%.

APPENDIX A

SCOPE AND CONTROL OF PRACTICE

PODIATRISTS/CHIROPODISTS: CONTROL OF PRACTICE

PROVINCE	CERTIFICATION/LICENSING/REGISTRATION			TRAINING PROGRAM/ACCREDIATION		
	Required Characteristics of Applicants	Certification Requirements	Licensing Requirements	Length of Training & Admission Requirements	Training Location	Educational Accreditation
SASKATCHEWAN	. 18 years old . Good character	. Member in good standing of Saskatchewan Association of Chiropodists on January 1, 1963 . Doctorate degree or its equivalent from an accredited college or university acceptable to the examiners . Be registered, and in good standing with Chiropodist Board of the U.K. . Be certified and registered with another body whose requirements are substantially equal to The Chiropody Profession Act, at the discretion of the Association, and satisfy the University of Saskatchewan of their qualifications	. Pass examination set by examiners appointed by University of Saskatchewan if not a member in good standing with associations described in Certification Requirements	. 3 years chiropody . 4 years podiatry	. No Schools of Chiropody or Podiatry in Saskatchewan . Chiropody training is provided in Britain . Podiatry training is provided in the United States	. Any college or school of Chiropody or Podiatry approved by the examiners appointed by the University of Saskatchewan
MANITOBA	. 18 years old . Good morals . Require personal identification	. Diploma (s) of graduation from a chartered school, college or university recognized by the Association . Membership with Association of Chiropodists at the time of coming into force of the Revised Statutes of the Act Respecting Chiropody	. Pass an examination of the Board . Pay prescribed fee to Association and become registered . Obtain and display certificate . Annual registration compulsory	. Minimum equivalence of matriculation qualification of the University of Manitoba . 4 years podiatry . 3 years chiropody	. No Schools of Chiropody or Podiatry in Manitoba . Chiropody training available in U.K. . Podiatry training in U.K.	. Any school, college or university recognized by the Manitoba Association of Chiropodists

PODIATRISTS/CHIROPODISTS: CONTROL OF PRACTICE

PROVINCE	CERTIFICATION/LICENSING/REGISTRATION			TRAINING PROGRAM/ACCREDIATION		
	Required Characteristics of Applicants	Certification Requirements	Licensing Requirements	Length of Training & Admission Requirements	Training Location	Educational Accreditation
BRITISH COLUMBIA	. 19 years old . Good moral character	. Doctor of Podiatric Medicine from an accredited school . Graduates of the (American) Board of Examiners of the American Podiatry Association, if have passed written and oral exams by the B.C. board . Registered podiatrist of another Canadian province	. Pass examination of Board of Examiners in Podiatry . Register with Board as passing required qualifications . Obtain and display certificate of registration from Board . Podiatrists are registered and licensed yearly	. Minimum of 4 academic years in podiatry . Pre-requisite of two years of Arts and Sciences at an approved univeristy . Podiatry college extrance exam to qualify for enrolment	. No school of podiatry in British Columbia . No European schools are comparable to the North American Standard in podiatry	. Any college of podiatric medicine with prescribed minimum curriculum, which has been examined by an accreditation team appointed by the Council on Education
ALBERTA	. 18 years old . Good moral character . Proof of good standing with other Canadian Podiatrists' Association, and with other countries' association	. Graduates of a training program approved by the Board of Examiners for Podiatry	. Produce copy of transcripts of credits issued by candidates college . Upon Board's discretion further examination may be required . Obtain a certificate of approval for registration from the Board, and pay fees . Display certificate . Register with the Alberta Podiatry Association . Mandatory annual registration with the Association	. Four years at School of Podiatry in the United States . Pre-requisite of two years university preparation	. No School of Podiatry in Alberta . Five Podiatry Schools in the United States	. Any school of podiatry approved by the Board of Examiners for Podiatry

(continued)

APPENDIX B

OCCUPATION BIBLIOGRAPHY

BIBLIOGRAPHY ON PODIATRY AND CHIROPODY

American Association of Colleges of Podiatric Medicine. "Podiatric Medicine Function and Education," Journal of Podiatric Education, Vol. 4, No. 1, March 1973.

"Functions and Educational Qualifications of Podiatrists In Public Health". American Journal of Public Health, September 1975, Vol. 65, No. 9.

Gorecki, G.A., Thaddeus P. Brziski. "Podiatric Medicine: A New Threshold In Health Manpower," American Journal of Public Health, Vol. 65, No. 11.

Pennell, Maryland Y. "Podiatric Education and Manpower," Journal of Podiatric Education, Vol. 1, No. 2, June, 1970.

The Journal of the Society of Chiropodists. The Chiropodist, Vol. 34, No. 3, March, 1979.

Alberta Podiatry Association. Proposal For Consideration of a Plan for the Establishment of a School of Podiatry at the University of Alberta in Edmonton, April, 1967.

Alberta Podiatry Association. Proposal For Consideration of a Plan for the Establishment of a School of Podiatry at the University of Calgary In Calgary, January, 1972.

American Podiatry Association. An Assessment of Foot Health Problems and Related Health Manpower Utilization and Requirements, Washington, D.C., August 10, 1976.

American Podiatry Association and American Association of Colleges of Podiatric Medicine. Podiatric Medicine: Its Role and Function Within Academic Health Science Centers, Panel presentation L'enfant Plaza Hotel, January 23, 1975.

Atkins, G.D. Division of Allied Health Auxiliaries, George Brown College Toronto. A Proposal Relating To The Training of Chiropodists, July, 1977.

Blauch, Lloyd E. The Podiatry Curriculum. American Association of Colleges of Podiatric Medicine, 1970.

British Columbia Association of Podiatrists. Letter to Honourable Mr. R.H. McClelland, Minister of Health, October 13, 1976.

British Columbia Health Association, Health Care Services. Health Care Memorandum L111: Podiatry to Administrators and Board Chairmen BCHA Health Care Centers, May, 1980.

College de Rosemont, Etude de la Podiatrie au Quebec. La Pertinence d'Implanter un Programme de Formation Professionnelle en Podiatrie. December , 1979.

Council on Education of the Canadian Podiatry Association. Terms of Reference for Evaluation and Accreditation in Podiatry Education and Hospital Podiatry Service, February, 1971.

Erlichman, S., M.M. Warner, British Columbia Podiatry Association. Preliminary Report For the Establishment of A School of Podiatry, June, 1973.

Floum, Lawrence S., James E. Bates. Some General Observations Necessary for an Understanding of Podiatry as a Profession.

Gleason, Jacqueline. National Center For Health Statistics, U.S. Department of Health, Education and Welfare, Preliminary Results of the Podiatry Manpower Survey of 1970.

Hedlin Menzies & Associates. Podiatry in Ontario, November, 1977.

Levy, Leonard A. "The Potential of Podiatric Medicine In Comprehensive Health Care," Public Health Reports, September, October, 1974, Vol. 89, No. 5.

National Center for Health Statistics, U.S. Department of Health, Education and Welfare. Podiatry Manpower: Characteristics of Clinical Practice, United States, 1970, (HRA) 74-1806, Series 14, No. 11, March, 1974.

National Center For Health Statistics, U.S. Department of Health, Education and Welfare"Preliminary Data From the Survey of Podiatrists: United States, 1974". Monthly Vital Statistics Report, Health Manpower Survey Data (HRA) 76-1120, Vol. 24, No. 7 Supplement October 24, 1975.

Nebraska State Department of Health. Nebraska Health Manpower Reports Podiatrists, 1977.

Ontario Council of Health, Ontario Ministry of Health. Proposed Scope of Practice for Chiropodists In Ontario, 1973.

Ontario Ministry of Health, Health Disciplines Committee. Statement of Policy In The Delivery of Foot Care.

Podell, Richard N. "Issues in the Organization of Medical Care: Podiatry in the United States." The New England Journal of Medicine, Vol. 284, No. 11, March 18, 1971.

President , Vice President and Registrar, Saskatchewan Association of Chiropodists." Letter to the Editor: Chiropody In Saskatchewan." The Chiropodist, 1976.

Research and Planning Division, Alberta Social Services & Community Health. Status Report: Podiatrists and Chiropodists for the Health and Social Services Disciplines Committee, December, 1978.

Vancouver General Hospital. First Year Podiatric Residency Training Program Manual, June 14, 1979.

Vancouver General Hospital. Resident Training Programme, Podiatry. Vancouver, British Columbia

Warner, Morton. Chiropody and Podiatry: Training Prerequisites, June 25, 1974.

Province of
British Columbia

Province of
Alberta

Province of
Saskatchewan

Province of
Manitoba

WESTERN CANADA
HEALTH MANPOWER TRAINING STUDY

Section III - Category # 1 - Report IV

OPHTHALMIC DISPENSING

REPORT IV

OPHTHALMIC DISPENSING: THE REQUIREMENT FOR ALTERNATIVE TRAINING AND FUNDING ARRANGEMENTS IN WESTERN CANADA

REPORT IV

OPHTHALMIC DISPENSING
THE REQUIREMENT FOR ALTERNATIVE TRAINING
AND FUNDING ARRANGEMENTS IN WESTERN CANADA

TABLE OF CONTENTS

STUDY BACKGROUND, OBJECTIVES AND APPROACH — PAGE

Study Background - General Introduction I
Study Origins I
Study Objective II
Study Timing II
Study Approach III

1. SUMMARY AND RECOMMENDATIONS

Introduction 1
Western Canada Overview 1
Manpower Training Recommendations 3

2. DISCUSSION OF OCCUPATION

Definition of Occupation 4
Role 4

TABLE OF CONTENTS (Continued) PAGE

3. NET MANPOWER REQUIREMENTS

GENERAL ASSUMPTIONS 11
. Manpower Stock 11
. Factors Affecting Manpower Supply 11
. Requirements 14
. Productivity 15
. Sensitivity Analysis 15

PROVINCIAL ASSUMPTIONS

. BRITISH COLUMBIA

. Legal Controls 16
. Insured Services 16
. Assumptions 16
. Stock 16
. Factors Affecting Manpower Supply 17
. Requirements 19
Net Requirements 20

. ALBERTA

. Legal Controls 21
. Insured Services 21
. Assumptions 22
. Stock 22
. Factors Affecting Manpower Supply 23
. Requirements 25
Net Requirements 26

TABLE OF CONTENTS (Continued) PAGE

PROVINCIAL ASSUMPTIONS (Continued)

. SASKATCHEWAN

. Legal Controls 27
. Insured Services 27
. Assumptions 27
. Stock 27
. Factors Affecting Manpower Supply 28
. Requirements 30
Net Requirements 31

. MANITOBA

. Legal Controls 32
. Insured Services 32
. Assumptions 33
. Stock 33
. Factors Affecting Manpower Supply 33
. Requirements 35
Net Requirements 35

4. TRAINING RECOMMENDATIONS 37

Appendix A - Scope And Control of Practice
Appendix B - Occupation Bibliography

STUDY BACKGROUND, OBJECTIVES AND APPROACH

STUDY BACKGROUND - GENERAL INTRODUCTION

The provision of effective health services to the community is, to a considerable degree, dependent on three essential resources:

- an adequate supply of well trained specialist staff in each health occupation group
- the development of adequate facilities to service the community
- the availability of adequate funds to ensure cost effective and efficient health services.

The range and complexity of health treatment programs has expanded greatly in Canada during the last twenty five years. In addition, changing technology and the development of new treatment programs have resulted in an increased requirement for skilled, adequately trained health manpower. These factors have resulted in an increased emphasis on manpower planning and skill training for health occupations to ensure an adequate supply of trained practitioners to meet defined manpower requirements.

STUDY ORIGINS

The Western Canada Health Manpower Training Study was initiated by the Western Premiers at their annual conference in 1980. The study is under the direction of a Steering Committee comprised of government representatives from the Provinces of British Columbia, Alberta, Saskatchewan and Manitoba. The members of the Steering Committee represent both the Health and Education departments within each provincial government.

STUDY OBJECTIVES

The study terms of reference contain two major objectives. These are:

- to assess the existing and future needs for health manpower training programs and facilities in Western Canada

- to make recommendations for the rationalization of the location and funding of health manpower training programs and facilities in Western Canada.

STUDY TIMING

The study consists of a review of 26 health occupations to be examined in five categories. The initial category consists of five occupations, selected for the study on the basis of current availability of training programs in Western Canada. Although the study is divided into five categories for review, each occupation within these is to be studied independently over the next two years. Several of the occupations are inter-related. The requirement for one kind of manpower may be influenced by that of another, yet the two occupations may not be reviewed at the same time. Therefore, the study recommendations should be reviewed once all the occupations have been studied.

STUDY APPROACH

Introduction

In order to achieve the study objectives, the work program consists of three key activities. These are:

- the analysis of manpower supply and requirements, and the calculation of net manpower requirements
- the analysis of existing training programs for Western Canada
- the development of recommendations for alternative training locations and funding arrangements

Analysis of Manpower Supply and Requirements

The analysis of manpower supply and requirements is designed to allow for a variety of data inputs, and for different emphasis depending on the occupation under review. A variety of data sources are used including provincial and national associations, health insurance agencies, and provincial health and education departments. In all instances, data is developed independently of previously published sources.

In addition to the basic projection of net manpower requirements, a number of sensitivity analyses have been completed to assess the impact of changes in the factors affecting supply and requirements, prior to developing recommendations for either additional training programs, or expanding existing training programs.

Approaches to Determining Manpower Requirements

The approach developed to determine manpower requirements uses three methods of projection. These are discussed below.

1. Service Utilization Approach

The utilization approach is based on an analysis of the pattern of health service usage. It establishes trends in service utilization and projects these onto future population estimates. There are three steps in the service utilization approach.

Step 1 - Determine Per Capita Utilization Rate

Historical data of the number of services provided, by age and sex of recipient is derived. The number of services per age/sex group is then divided by the population for that group in the corresponding year. This results in a per capita utilization rate.

Step 2 - Project Future Service Required

The per capita utilization rate is projected onto the low, medium and high population for each year from 1981 to 2000. This results in an estimate of total future services.

Step 3 - Estimated Number of Practitioners Required

Having determined the total future services, the model projects the number of practitioners required, by assuming a constant level of services per practitioner. The number of services per

practitioner is determined by dividing total services by the number of practitioners in the base year. To estimate the required number of practitioners, the model divides total future services required by the number of services per practitioner.

2. Service Target Ratio Approach

Service target ratios reflect a theoretical optimal manpower level required to meet health service requirements in the occupation under review. They are expressed as the ratio of practitioner to population. The service target ratios are derived based on discussion with health authorities, review of published reports, articles and summary of defined health care needs.

3. Population Ratio Approach

Population ratios are derived by dividing the total population at a specified point in time by the number of active practitioners. This results in a ratio of practitioners to population.

These ratios are analysed to determine if any trends exists. To project future manpower requirements, the model divides total projected population by the previously determined population ratio.

EXAMPLE 1

TABLE

NET REQUIREMENTS

(Incremental and Cumulative)

YEAR	Low Population Scenario						Medium Population Scenario						High Population Scenario					
	LOW		MEDIUM		HIGH		LOW		MEDIUM		HIGH		LOW		MEDIUM		HIGH	
	B	B	A	A	C	C	B	B	A	A	C	C	B	B	A	A	C	C
1981	1	1	1	1	6	6	1	1	1	1	7	7	4	4	4	4	10	10
1982	-1	0	-1	0	-1	5	-1	0	-1	0	-1	6	-1	3	0	4	0	10
1983	-2	-2	-2	-2	-2	3	-1	-1	-1	-1	-1	5	-1	2	-2	2	-1	9
1984	-3	-5	-4	-6	-3	0	-3	-4	-3	-4	-3	2	-2	0	-2	0	-2	7
1985	8	3	8	2	8	8	9	5	8	4	9	11	9	9	9	9	9	16
1990	0	3	0	2	0	8	2	7	3	7	3	14	6	15	7	16	7	23
1995	-12	-9	-12	-10	-12	-4	-8	-1	-9	-2	-9	5	-4	11	-5	11	-4	19
2000	-10	-19	-11	-21	-10	-14	-6	-7	-7	-9	-7	-2	-2	9	-2	9	-2	17

Requirements derived using:

A. Historical ratio approach of 1:10,621 achieved in 1976
B. Utilization approach using curent services. No productivity
C. Service target ratio approach of 1:10,000

Summary of Approaches to Projecting Manpower Requirements

The three approaches outlined above have been used for the calculation of manpower requirements for this occupation. The specific application of each approach to this occupation is discussed under Requirements (Section 3.1.3 below).

Presentation of Provincial Net Manpower Requirements

At the conclusion of each provincial section of this report, Section (d) summarizes net manpower requirements, and shows both the incremental and cumulative requirement for each approach within three population scenarios. Example 1, opposite, shows a typical net requirement table.

The table is divided into three sections, low, medium, and high population scenarios. Within each section, low, medium, and high manpower requirement estimates are shown. The manpower requirement approach used to derive these is identified by a letter (A,B,C), which refers to the footnotes. Within each approach, two set of figures are shown for each time point. The left hand column shows the incremental net requirement, and the right hand column shows the cumulative net requirement.

Analysis of Existing Training Programs in Western Canada

This initial study category is composed of occupations for which there are currently no training programs in Western Canada. As part of this initial study we have, however, developed a basic approach for analysing existing training programs for subsequent occupation categories.

Development of Recommendations for Alternative Training Locations and Funding Arrangements

We have developed a decision process to assist in developing recommendations for alternative training location(s) and funding arrangements. This process is designed to allow for the logical, consistent evaluation of a range of training alternatives.

There are seven steps in the decision process:

- Step 1. Analysis of manpower requirements
- Step 2. Identification of the appropriate type(s) of training
- Step 3. Definition of alternative training locations
- Step 4. Evaluation of alternative locations for new programs
- Step 5. Establishment of timing of training program requirement
- Step 6. Recommendation on training action(s) and location(s)
- Step 7. Recommendation on funding alternative(s)

Recommendations for future training location and funding arrangements specific to this occupation are discussed in Section 4, below.

EXHIBIT 1

NET MANPOWER REQUIREMENTS - OPHTHALMIC DISPENSING

WESTERN CANADA REGION - 1981 to 2000

MEDIUM POPULATION PROJECTION

	POPULATION RATIO		UTILIZATION		SERVICE TARGET	
YEAR/APPROACH	INCREMENTAL	CUMULATIVE	INCREMENTAL	CUMULATIVE	INCREMENTAL	CUMULATIVE
1981	-52	-52	-50	-50	-336	-336
1982	-50	-102	-52	-102	-58	-394
1983	-52	-154	-51	-153	-58	-452
1984	-48	-202	-49	-202	-57	-509
1985	-56	-258	-56	-258	-61	-570
1990	-227	-535	-270	-528	-312	-882
1995	-279	-814	-254	-782	-309	-1,191
2000	-268	-1,082	-228	-1,010	-297	-1,488

1. SUMMARY AND RECOMMENDATIONS

1.1 INTRODUCTION

This report addresses the projected net requirement for ophthalmic dispensers in the Provinces of British Columbia, Alberta, Saskatchewan and Manitoba, for the period 1981 to 2000. The study process begins with an assessment of the current stock of ophthalmic dispensers in each province, and of the factors likely to influence this stock in the future. The net requirement for ophthalmic dispensing manpower over the projection period is obtained from a comparison of projected manpower supply and requirements.

For each province and the Western Region, the projected future requirements for ophthalmic dispensers are subjected to a sensitivity analysis, in order to determine the importance of underlying assumptions to the net result. The last step of the study process is to determine the requirement for alternative location and funding arrangements for the training of ophthalmic dispensers in Western Canada. The recommendations concerning training are summarized below.

1.2 WESTERN CANADA OVERVIEW

Exhibit 1, opposite, shows the manpower requirements for

ophthalmic dispensers for Western Canada. The requirements have been derived using a medium population projection, and represent three alternative scenarios. These are net manpower requirements based on:

1. the current population ratio

2. the target ratio of 1 practitioner for 10,000 population

3. the current level of service utilization with no increase in productivity

In each of the above, net manpower requirements were derived for each province, and then combined to determine the net requirements for Western Canada.

Highlights

Throughout the forecast period (1981-2000), there is an indicated surplus of ophthalmic dispensers in Western Canada. The population ratio approach, and the utilization approach indicate a surplus of 1082 and 1010 ophthalmic dispensers respectively, in the year 2000. The service target approach indicates a surplus of 1488 in the year 2000. Thus, there is a potential surplus of approximately 50 to 75 practitioners per year throughout the forecast period.

Although the manpower needs will be met in Western Canada, there are limitations in the current correspondence approach to training. This suggests that an innovative training approach is required.

1.3 MANPOWER TRAINING RECOMMENDATIONS

- That no college-based training program for ophthalmic dispensing be established in Western Canada.

- That a review of current training methods and materials be conducted with consideration given to alternative training approaches, including audio-visual and video training.

2. DISCUSSION OF THE OCCUPATION - OPHTHALMIC DISPENSING

2.1 DEFINITION OF OPHTHALMIC DISPENSING

Ophthalmic dispensers are defined as practitioners who:

"Fit clients with prescription eyeglasses or contact lenses. Read prescription to obtain lens specifications. Measure client's eye curvature, pupillary distance and bridge width, using ceratometer and other optical measuring devices. Show current styles of eyeglass frames to client and suggest frames which compliment client's features. Cut and edge lenses and fit lenses into frames. Adjust finished eyeglasses to fit client. Fit contact lenses. Instruct clients in procedure for inserting, removing and cleaning contact lenses. Arrange for grinding and polishing of lenses or grind and polish lenses. Sell sunglasses, magnifying glasses, binoculars and other optical goods."[1]

2.2 ROLE

2.2.1 Historical Evolution

Spectacles were first used for the correction of visual defects in the 13th century. They were prefabricated and sold in 20 powers by artisans, the ancestors of ophthalmic dispensers. Advances in optical science in the 18th century resulted in the introduction of bi-focal and cylindrical lenses, which corrected for near and far sightedness and astigmatism, respectively. The number of lens combinations made possible by these advances, and demand by the public for separate lenses for the correction of visual dysfunction in each eye, created a need for made to order spectacles. In response to this need, opticians started conducting visual examinations in addition to lens fabrication and dispensing.

1. Canadian Classification and Dictionary of Occupations, 1971

By the 19th century, some opticians had specialized in fabrication and dispensing while others concentrated on vision testing. The former group became ophthalmic dispensers, while the latter group were the forerunners of optometrists.

2.2.2 Function

Ophthalmic dispensers specialize in the dispensing of eye wear and in some cases in fabrication as well. However, they cannot perform eye examinations or prescribe treatment. Although most dispensers work in retail optical shops, some are employed by optometrists or optical laboratories.

Ophthalmic dispensers provide services to customers who have prescriptions from ophthalmologists and optometrists, as well as to those wishing to change eye wear without a change in prescription. They advise patients on appropriate lenses and frames. The prescription is interpreted and fabricated either by the dispensers themselves, or by an optical laboratory. Afterward, the completed work is checked to ensure that the eye wear is correctly fabricated. Ophthalmic dispensers fit and adjust the spectacles and advise customers on their correct use. In addition to dispensing spectacles, some dispensers can with additional training, fit and adjust contact lenses.

2.2.3 Contribution To Continuum Of Health Care Delivery

Vision care services are primarily provided by optometrists, ophthalmologists, and ophthalmic dispensers. Whereas optometrists treat the healthy eye to increase its functional efficiency, the ophthalmologist deals with eye diseases and performs surgery as well.

Ophthalmic dispensers make, fit, supply and adjust eye wear according to prescriptions written by optometrists or ophthalmologists. While opticianry is part of the vision care system, dispensing operates in the retail profit-motivated environment.

2.2.4 RELATIONSHIP WITH OTHER OCCUPATIONS

In this subsection, the relationship of ophthalmic dispensers to ophthalmologists and optometrists is described.

Ophthalmologists

Generally, ophthalmic dispensers are closely associated with medicine, particularly ophthalmologists. Dispensers obtain the core of their customers from ophthalmologists who have traditionally steered their patients to retail optical outlets. Conversely, ophthalmic dispensers will arrange appointments for their customers with ophthalmologists.

Optometrists

Because optometrists often dispense optical appliances in their offices, conflict exists between ophthalmic dispensers and optometrists. Opticians argue that there is a conflict of interest when optometrists dispense frames and merchandise, in addition to prescribing. As

well, they feel that it is not cost effective for optometrists to dispense when they are trained to perform visual examinations. Opticians are also concerned about the qualifications of optometric assistants, since they need not be registered.

Optometrists view dispensing as an essential ingredient in assessing the effectiveness of the diagnosis. They want control over the quality of ophthalmic materials prescribed and accuracy in fabricating the lenses from the prescription. Because dispensing is considered an essential part of service and generates significant income, optometrists are concerned about ophthalmic industry advertisements encouraging patients to have their prescription filled outside the office. Provincial legislation prohibits optometrists from advertising.

Optometrists also feel that opticians are undertrained to dispense contact lenses. As well, the use of optometric equipment in the dispensing of contact lenses by ophthalmic dispensers is viewed as an infringement on the scope of the optometric profession. The British Columbia Optometric Act specifically prohibits optometrists from sharing contact lens work with opticians.

Recommendations Respecting The Role Of Ophthalmic Dispensers

Vision care studies have dealt with the relationship of ophthalmic dispensers, optometrists, and ophthalmologists. The Study of Vision Service Delivery in Ontario[2] suggested

2. Woodruff, M.E. and B. Schmidt, A Study of Vision Service Delivery in Ontario, with Recommendations for Meeting the Unmet Needs For Vision Care and Rationalization of The Delivery of Vision Care Services, 1977

that optometrists remove themselves from dispensing wherever it is economical for an ophthalmic dispenser to set up an outlet. It was also recommended that contact lens services should be limited to optometrists and ophthalmologists with the dispensing done by ophthalmic dispensers who are accountable to the prescriber. In addition, the task force suggests that ophthalmic dispensers only be allowed to fabricate hard lenses. For soft lenses, the biological and pharmaceutical requirements were considered to be outside the scope of training received by opticians.

The British Columbia Vision Care Task Force[3] also made recommendations regarding the respective roles of ophthalmic dispensers, optometrists and ophthalmologists. Unlike the Ontario study, it did not recommend that optometrists discontinue dispensing, but it did suggest that they provide optical devices at cost and that services be charged on a fee for service basis. Dependent on the establishment of an adequate Dispensing Opticians Act and a training program, the task force suggested that changes be made in the Optometry Act to permit the flow of optometric contact lens prescriptions to dispensing opticians, and to allow opticians to use any devices necessary to fit contact lenses.

2.2.5 Legislation

Legislation regulating ophthalmic dispensers exists in Alberta, Saskatchewan and Manitoba but not in British Columbia. The British Columbia Vision Care Task Force recommends an act to regulate dispensing opticians. The act, by restricting dispensing to qualified individuals,

3. Report of The Vision Care Task Force, Ministry of Health, British Columbia, 1977

would help to protect the public from inferior products and workmanship. As well, the special qualifications required to fit contact lenses would reduce potentially dangerous contact lens fitting.

Although occupational legislation exists in Alberta, Saskatchewan and Manitoba, the regulation of ophthalmic dispensing causes some concern. Presently, the legislation only requires that a retail optical outlet have a licensed ophthalmic dispenser on staff. The profession feels that each outlet should have a qualified dispenser present during all operating hours.

2.2.6 Insurability Of Service

Ophthalmic services are not generally insured in Canada. In Alberta, the Extended Health Benefits Program insures optical goods and services prescribed following an eye examination, without payment of a premium, for registered residents aged 65 or over, their spouse and dependents. Other provinces have also considered providing ophthalmic appliances to particular groups. The Task Force on Eye Care in Nova Scotia[4] recommended that the Council of Health consider supplying optical goods without charge to the needy. Instead of limiting coverage to particular groups, the Study of Vision Service Delivery in Ontario, suggested that ophthalmic services be insured on a fee for service basis with ophthalmic materials supplied at cost.

2.2.7 Education

There are no formal training programs for ophthalmic dispensers in Western Canada. Three to four years of on-

4. Report of The Task Force On Eye Care, Nova Scotia Council of Health, 1972

the-job training is received instead, under experienced technicians who teach the optical knowledge with respect to lenses and frames. This is supplemented by a two year correspondence course through the Canadian Guild of Dispensing Opticians. Some provinces have organized monthly seminars to assist students in the correspondence program. For qualified ophthalmic dispensers, there is also a home study course in contact lens fitting.

Although no formal training programs exist in Western Canada for ophthalmic dispensing, two year community college programs are offered at Seneca College in Toronto and at Georgian College in Barrie, as well as at numerous colleges in the United States. The United States also has training programs for optometric and ophthalmic assistants. Both these ocular allied health occupations are trained in dispensing and contact lens work.

2.2.8 Optical Industry

The supply and distribution of ophthalmic materials is dominated by three firms with Imperial Optical having the greatest control and influence. Although there are individually owned outlets, the suppliers largely control the sale of lenses and frames through company-owned retail outlets. In 1978, the Restrictive Trade Practices Commission concluded that the vertical integration of the ophthalmic industry may be contrary to public interest. Monopolies in the manufacture and sale of materials have limited supply, resulted in higher prices, and created a need for more quality control.

TABLE IV.0.1

TOTAL NUMBER OF OPHTHALMIC

DISPENSERS IN WESTERN CANADA, 1970 to 1980

YEAR	BRITISH COLUMBIA[1]	ALBERTA[3]	SASKATCHEWAN[4]	MANITOBA[5]
1970	-	-	-	60
1971	-	-	-	62
1972	-	-	-	65
1973	-	139	-	65
1974	-	159	-	65
1975	-	184	-	62
1976	447	200	-	65
1977	-	206	-	68
1978	-	216	68	61
1979	-	230	97	59
1980	541[2]	242	103	64

Notes:
1. British Columbia Vision Care Task Force.
2. Study estimate.
3. Alberta Guild of Ophthalmic Dispensers.
4. Saskatchewan Ophthalmic Dispensers Association.
5. Ophthalmic Dispensers of Manitoba.

TABLE IV.0.2

FACTORS AFFECTING MANPOWER SUPPLY

OF OPHTHALMIC DISPENSERS

FACTOR	BRITISH COLUMBIA[1]	ALBERTA[2]	SASKATCHEWAN[3]	MANITOBA[4]
Opening stock	541	242	103	64
Net migration	11 per year	5 per year	-3 per year	1 per year
Net immigration	0 per year	0 per year	-2 per year	0 per year
Net occupational shifts	0 per year	0 per year	1 every three years	0 per year
Training output	48 per year	20 per year	10 per year	7 per year
Active to inactive flows	0 per year	0 per year	0 per year	0 per year
Attrition	9 per year	1980 age distribution and retirement at 65 per year	1980 age distribution and retirement at 65 per year	1980 age distribution and retirement at 65

Notes:
1. Study derived estimates.
2. Interview and data input from the Alberta Guild of Ophthalmic Dispensers.
3. Saskatchewan Ophthalmic Dispensers Association interview and data input.
4. Interview and data input from Ophthalmic Dispensers of Manitoba.

3. NET MANPOWER REQUIREMENTS

3.1 GENERAI ASSUMPTIONS

3.1.1 Manpower stock 1970 to 1980

The total number of ophthalmic dispensers in Western Canada from 1970 to 1980 is shown in Table IV.0.1, opposite. Currently, there are about 950 ophthalmic dispensers. Except for British Columbia, data from ophthalmic dispensers associations were used in the manpower supply analysis. The counts included ophthalmic dispensers certified by the Canadian Guild of Ophthalmic Dispensers. Alternative manpower counts and an identification of definitional differences among sources is discussed in detail under provincial parameters. As the Association of British Columbia Dispensing Opticians did not wish to cooperate in this study, the only historical stock information is from the British Columbia Vision Care Task Force Report.

3.1.2 Factors Affecting Manpower Supply

Table IV.0.2, opposite, shows the assumptions made with respect to each of the factors which have the potential to affect stock, that is, migration, immigration, occupational shifts, training output, active to inactive movements, and attrition. Each of these factors is discussed in more detail in the sectious following. As the Association of British Columbia Dispensing opticians did not wish to participate in the study, we made assumptions regarding the factors

affecting manpower stock, based on the relationships of the factor and current stock in Alberta.

- Net Migration

  Data specific to interprovincial migration of ophthalmic dispensers is not available. However, estimates of net migration were derived using data and interview input from provincial associations. Alberta and Manitoba have both experienced net gains through migration whereas Saskatchewan has lost ophthalmic dispensers every year. The net migration rate as a proportion of opening stock is assumed to be the same in British Columbia as in Alberta. Migration rates are assumed to hold until 2000.

- Net Immigration

  In general, the associations indicated that immigration and emigration are insignificant factors in determining ophthalmic dispensing manpower.

- Occupational Shifts

  Except for Saskatchewan, the associations reported no losses due to occupational changes by ophthalmic dispensers. Consequently, we have assigned a value of zero to net occupational shifts in British Columbia, Alberta, and Manitoba, while in Saskatchewan losses are assumed to be 1 every 3 years over the forecast period.

Training Output

To estimate training output, we applied attrition rates to current enrolment levels in the Canadian Guild correspondence course. The Educational Chairman of the Alberta Guild indicates the attrition rates for this course are 50% and 33% for first and second year students, respectively. As a result, we have assumed that Alberta, Saskatchewan and Manitoba gain 20, 10, and 7 practitioners respectively, from training, each year over the forecast period. We estimate that in British Columbia, 48 students graduate every year, based on the ratio of graduates to current stock in the other provinces. The forecasts were made assuming a constant training output for 1981 to 2000.

Active To Inactive Flows

According to the associations in Alberta, Saskatchewan, and Manitoba, there is no inactive pool of ophthalmic dispensers in Western Canada, although a few members work only part-time. These part-time practitioners are treated as fully active since the distribution of full to part-time practitioners is not known.

The future stock of ophthalmic dispensers may be affected by the age-sex distribution of practitioners, if female participation is less than that of males. Female practitioners in Alberta, Saskatchewan, and Manitoba account for about 22% of the active stock.

The current sex distribution is likely to change because over 50% of present student enrolment is female. There is no historical evidence to suggest that female labour force participation will be less than that of males, hence, this variable is assigned a value of zero over the forecast period.

Attrition from Death and Retirement

Using the age distribution of current stock, a pattern retirements over the forecast period was obtained by automatically retiring all ophthalmic dispensers at age 65. In Alberta, Saskatchewan, and Manitoba, approximately 130 practitioners or about one third of the current stock is 45 years of age, and expected to retire in the next 20 years. In British Columbia, it is estimated that 9 practitioners per year will retire, based on the proportion of current stock retiring in the other provinces.
Separate estimates of attrition through death were not made due to the high joint probability of death and retirement, and the small size of the occupational group.

3.1.3 Requirements

- Historical ratio

The current ratio of ophthalmic dispensers to population in each province was used to project the

TABLE IV.0.3

CHARACTERISTICS OF PERSONS WITH CORRECTIVE LENSES

AGE GROUP	PERCENTAGE OF PERSONS WITH CORRECTIVE LENSES	
	MALE	FEMALE
3 - 16	13	17
17 - 24	34	49
25 - 44	35	48
45 - 54	76	86
55 - 64	89	95
65 and over	90	95

Source: "Characteristics of Persons with Corrective Lenses," National Center for Health Statistics, United States Department of Health, Education and Welfare, 1966.

future manpower required to maintain the current level of service.

- Utilization

As ophthalmic services are not insured under basic medical insurance plans, service utilization data is not readily available. However, the age-sex distribution of ophthalmic services was estimated using a 1965 survey of the number of persons with corrective lenses. Table IV.0.3, opposite, shows the characteristics of persons with corrective lenses.

- Service target ratio

Manpower requirements were estimated using a ratio of of 1 qualified optician to 10,000 population. The Ministry of Health in Ontario uses this service target ratio.

3.1.4 Productivity

No change in the productivity of ophthalmic dispensers was assumed given the lack of information in this area.

3.1.5. Sensitivity Analysis

Because of the size of the indicated surplus under each of the approaches used to determine net manpower requirements, we did not undertake a sensitivity analysis of the assumptions.

3.2 PROVINCIAL PARAMETERS

3.2.1 BRITISH COLUMBIA

a) Legal Controls

There is no legislation governing the right to practice in British Columbia. A Dispensing Optician Act was recommended in the Vision Care Task Force and is currently under review.

b) Insured Services

Services provided by dispensing opticians are not covered by the Medical Services Plan.

c) Assumptions

i Stock

. Historical Stock - As the Association of British Columbia Dispensing Opticians did not wish to cooperate in this study, only published data and information from other provinces were used in developing manpower assumptions.

The only historical stock information quantified is the estimate of the number of opticians by the British Columbia Vision Care Task Force in 1976. Using membership lists provided by the Association of British Columbia Dispensing Opticians, the task force estimated that there were 447 members who would presumably meet the Canadian Guild standards.

TABLE IV.1.1

FACTORS AFFECTING MANPOWER SUPPLY

OPTHALMIC DISPENSERS, BRITISH COLUMBIA

FACTOR	ASSUMPTION	SOURCE
Opening stock	541	Study estimate[1]
Net migration	11	Study estimate[2]
Net immigration	0	Study estimate
Net occupational shifts	0	Study estimate
Training output	48	Study estimate
Active to inactive flows	0	Study estimate
Attrition	9	Study estimate

Notes: 1. The opening stock assumed a 4.8% increase from 1976 which was derived from Alberta data.

2. Assumptions regarding factors affecting the manpower stock were based on the relationship of the factor and current stock in Alberta.

. Current Stock 1980 - The study team estimated the current stock at 541 persons assuming a net increase of 4.8% per year. This rate was derived from the rate of increase in Alberta from 1976 to 1980.

ii Factors Affecting Manpower Supply

Table IV.1.1, opposite, shows the assumptions made with respect to each of the factors which have the potential to affect stock, that is, migration, immigration, occupational shifts, training output, active to inactive movements, and attrition. Because the Association of British Columbia Dispensing Opticians did not provide information about these supply factors, we made assumptions regarding the factors affecting manpower stock, based on the relationship of the factor and current stock in the other provinces. The development of these assumptions is discussed in more detail below.

. Net Migration - We assumed that inmigration to British Columbia would be similar to that experienced in Alberta. The rate of inmigration in Alberta was estimated at 5 persons per year or 2% of current stock. Therefore, net migration for British Columbia was assumed to be 2% of the estimated current stock of 541 or 11 persons per year.

. Net Immigration - The guilds and associations in the other western provinces indicated that immigration and emigration are not significant

factors affecting their ophthalmic dispensing manpower, hence, a value of zero was assigned to this variable for British Columbia.

. Net Occupational Shifts - Guild and association presidents in the other western provinces reported few losses due to occupational changes by ophthalmic dispensers. Consequently, net occupational shifts of dispensing opticians in British Columbia were assumed to be zero.

. Training Output - The total number of recent graduates for Alberta, Saskatchewan and Manitoba, of the Canadian Guild of Ophthalmic Dispensers correspondence course represents about 9% of the current stock. At this rate, about 48 students would qualify for membership in the Association of British Columbia Dispensing Opticians each year. In the manpower stock projections, this rate is assumed to continue to the year 2000.

. Active to Inactive Flows - As there are few inactive ophthalmic dispensers in the other provinces, and no evidence to suggest that participation of females will be less than that of males in the future, this variable has been assigned a value of zero over the forecast period.

. Attrition from Death and Retirement - In total, for Alberta, Saskatchewan, and Manitoba, we have assumed that 32% of the current stock of ophthalmic dispensers will retire or die during the forecast period. If the same proportion of

TABLE IV.1.2

TOTAL ESTIMATED NUMBER OF CORRECTIVE

LENSES WORN IN BRITISH COLUMBIA FOR 1980

AGE GROUP	PERCENTAGE OF PERSONS WITH CORRECTIVE LENSES[1]		B.C. POPULATION 1980[2]		ESTIMATED NUMBER OF CORRECTIVE LENSES WORN	
	MALE	FEMALE	MALE	FEMALE	MALE	FEMALE
3 - 16	13	17	288,620	276,260	37,521	46,964
17 - 24	34	49	196,620	191,400	66,851	93,786
25 - 44	35	48	388,200	378,100	135,870	181,488
45 - 54	76	86	138,400	131,900	105,184	113,434
55 - 64	89	95	113,800	128,300	101,282	121,885
65 and over	90	95	122,200	153,900	109,980	146,205

Notes: 1. "Characteristics of Persons with Corrective Lenses," National Center for Health Statistics, United States Department of Health Education and Welfare, 1966.

2. British Columbia Central Statistics Bureau, Projection 51.

the existing stock in British Columbia retire or die, the average attrition will be 9 persons per year. This attrition rate is assumed over the forecast period.

iii Requirements

. Historical Population Ratio - The 1980 ratio of ophthalmic dispensers to British Columbia population of 1:4849 was used to determine the number of practitioners that would be required in the future to maintain the current level of service.

. Utilization - The measure of utilization adopted as a proxy for services provided by ophthalmic dispensers is the estimated number of corrective lenses worn. The method of estimation uses the incidence of corrective lenses by age and sex from a 1965 survey conducted by the United States Bureau of Health Statistics, and an estimate of British Columbia population in 1980 to arrive at an estimated number of corrective lenses worn in 1980. Table IV.1.2, opposite, shows the results of these calculations.

. Service Target Ratio - Requirements were projected to achieve a service target of 1 optician to 10,000 population. This ratio is used by the Ministry of Health in Ontario to project requirements. In some studies, a ratio of qualified opticians to ophthalmologists of 2:1 is used. Since there is approximately 1

TABLE IV.1.3

NET REQUIREMENTS, BRITISH COLUMBIA, OPHTHALMIC DISPENSERS

(Incremental and Cumulative)

	Low Population Scenario						Medium Population Scenario						High Population Scenario					
YEAR	LOW		MEDIUM		HIGH		LOW		MEDIUM		HIGH		LOW		MEDIUM		HIGH	
	C	C	A	A	B	B	C	C	A	A	B	B	C	C	A	A	B	B
1981	-326	-326	-44	-44	-42	-42	-324	-324	-40	-40	-39	-39	-321	-321	-35	-35	-35	-35
1982	-46	-372	-41	-85	-40	-82	-44	-368	-38	-78	-38	-77	-44	-365	-37	-72	-38	-73
1983	-45	-417	-41	-126	-40	-122	-45	-413	-39	-117	-38	-115	-44	-409	-38	-110	-37	-110
1984	-46	-463	-41	-167	-40	-162	-44	-457	-38	-155	-38	-153	-44	-453	-37	-147	-37	-147
1985	-46	-509	-42	-209	-39	-201	-44	-501	-39	-194	-38	-191	-44	-497	-37	-184	-37	-184
1990	-229	-738	-206	-415	-197	-398	-223	-724	-193	-387	-187	-378	-218	-715	-185	-369	-182	-366
1995	-231	-969	-212	-627	-194	-592	-226	-950	-200	-587	-184	-562	-221	-936	-190	-559	-178	-544
2000	-234	-1203	-218	-845	-193	-785	-228	-1178	-205	-792	-183	-745	-224	-1160	-196	-755	-175	-719

Requirements derived using:

A. Historical ratio approach of 1:4,849 achieved in 1980
B. Utilization approach based on estimated number of corrective lenses
C. Service target ratio approach of 1:10,000

ophthalmologist for 20,000 population in British Columbia, a ratio of 1:10,000 is appropriate using this methodology as well.

d) Net Requirements

Table IV.1.3, opposite, shows the net manpower requirements (incremental and cumulative).

. Highlights - Based on the medium population scenario, there is a surplus of manpower under each of the projection approaches used. The service target ratio approach projects a surplus of 1178 ophthalmic dispensers by the year 2000. Based on the utilization approach, there is a surplus of 745, while the historical ratio approach projects a surplus of 792 ophthalmic dispensers by the same year.

3.2.2 ALBERTA

a) Legal Controls - The Ophthalmic Dispensers Act of Alberta defines ophthalmic dispensing as:

"the supplying, preparing, or dispensing of ophthalmic appliances or interpreting prescriptions from ophthalmologists or optometrists in respect of ophthalmic appliances or the fitting, adjusting, or adapting of ophthalmic appliances to the needs of the intended wearer in accordance with a prescription from an ophthalmologist or optometrist or without a prescription where lenses are duplicated with no change in their refractive value."

The act goes on to define ophthalmic appliances as:

"lenses, spectacles, eye-glasses, frames, contact lenses, artificial eyes or other devices for the relief, prevention or correction of visual or other anomalies of the eyes."

Only persons who hold a certificate of competency issued by the Ophthalmic Dispensers Examining Board are authorized to engage in ophthalmic dispensing. A special certificate of competency is required to dispense contact lenses. These certificates are issued to persons meeting the prescribed educational and practical qualifications.

b) Insured Services

Optical goods and services are provided at no charge to eligible participants through the Extended Health Benefits Program under the Alberta Health Care Insurance Plan. Residents aged 65 or over, their spouses and dependents are eligible for benefits through the program. The benefit for new eyeglasses is not payable more than once every three years,

TABLE IV.2.1

TOTAL NUMBER OF OPHTHALMIC DISPENSERS

IN ALBERTA, 1973 to 1979

YEAR	ALBERTA HEALTH CARE INSURANCE PLAN[1]	ALBERTA SOCIAL SERVICES AND COMMUNITY HEALTH[2]	ALBERTA GUILD OF OPHTHALMIC DISPENSERS[3]
1973	-	-	139
1974	-	-	159
1975	99	-	184
1976	109	192	200
1977	108	189	206
1978	117	201	216
1979	128	213	230

Notes:

1. The Alberta Health Care Insurance Plan count includes ophthalmic dispensers billing the plan for services covered under Extended Health Benefits Plan. The data was summarized from the annual reports.

2. The count provided by Alberta Social Services and Community Health includes the number of active members registered with the Alberta Guild of Ophthalmic Dispensers. The source is the Report on Health and Social Service Manpower in Alberta, 1979.

3. The Registrar of the Alberta Guild of Ophthalmic Dispensers provided the study team with counts of the number of ophthalmic dispensers active in the province.

TABLE IV.2.2

TOTAL NUMBER OF ACTIVE OPHTHALMIC DISPENSERS REGISTERED IN ALBERTA, BY AGE AND SEX, 1979

AGE GROUP	MALE	FEMALE	TOTAL
Less than 25	3	6	9
25 - 29	27	15	42
30 - 34	37	10	47
35 - 39	34	3	37
40 - 44	16	5	21
45 - 49	23	6	29
50 - 54	22	1	23
55 - 59	10	0	10
60 - 64	9	2	11
65 and over	0	1	1
Total	48	182	230

Source: The Alberta Guild of Ophthalmic Dispensers

unless the eyeglasses are accidentally damaged beyond repair or a change of prescription was necessary following surgery.

c)

Assumptions

1 Stock

. Historical stock 1973 to 1979 - The total number of active ophthalmic dispensers in Alberta from 1973 to 1979 is shown in Table IV.2.1, opposite. The counts provided by the Alberta Guild of Ophthalmic Dispensers (AGOD) and Alberta Social Services and Community Health include all ophthalmic dispensers residing in the province and holding an active registration. The Alberta Health Care Insurance Plan count includes only ophthalmic dispensers billing the plan for Extended Health Care Services. This difference accounts for the discrepancies in total numbers. The AGOD data was used in the manpower supply analysis.

. Current stock 1980 - The most current information regarding the stock of active ophthalmic dispensers by age and sex is presented in Table IV.2.2, opposite. In 1979, 230 ophthalmic dispensers were registered and active in the province and of these 48 were female and 182 male. Currently in 1980, there are 242 registered members.

TABLE IV.2.3

FACTORS AFFECTING MANPOWER SUPPLY

ALBERTA, OPHTHALMIC DISPENSERS

FACTOR	ASSUMPTION	SOURCE
Opening stock	242	AGOD records
Net migration	5 per year	AGOD records
Net immigration	0 per year	Interviews with the President of the AGOD
Net occupational shifts	0 per year	Interviews with the President of the AGOD
Training output	20 per year	Interview with Educational Chairman of AGOD
Active to inactive flows	0 per year	Interview with President of AGOD
Attrition	1980 age distribution and retirement at 65	AGOD records

ii Factors Affecting Manpower Supply

Table IV.2.3, opposite, shows the assumptions made with respect to each of the factors which have the potential to affect stock, that is, migration, immigration, occupational shifts, training output, active to inactive movements, and attrition. Each of these factors is discussed in more detail in the following sections.

. Net migration - Data specific to the inter-provincial migration of ophthalmic dispensers is not available. However, estimates of net migration have been derived using data provided by the Alberta Guild. The data indicates that 25 ophthalmic dispensers entered the province in the last 4 years. The President of the Guild indicated that generally only 2 members leave Alberta every year. We have assumed a net migration rate of 5 persons per year based on this information.

. Net immigration - The Guild President indicated that immigration and emigration are insignificant factors affecting ophthalmic dispensing manpower. As a result, the net immigration factor is assumed to be zero over the forecast period.

. Net occupational shifts - The Guild President reported no losses due to occupational changes by ophthalmic dispensers. Consequently, we have assigned a value of zero to net occupational shifts for the period 1981 to 2000.

. Training Output - The Guild records show 64 first year students and 31 second year students registered in the correspondence course of the Canadian Guild of Ophthalmic Dispensers. The Educational Chairman indicated that the attrition rates are 50% and 33% for the first and second year students respectively. Using these percentages, we have assumed 20 graduates every year for the forecast period.

. Active to Inactive Flows - The President of the Guild indicated in an interview that there is no inactive pool of ophthalmic dispensers in Alberta, although a few members work only part-time. These part-time practitioners are treated as fully active since the distribution of full to part-time practitioners is not known.

The future stock of ophthalmic dispensers may be affected by the age-sex distribution if female labour force participation is less than that of males. Female practitioners currently account for about 20% of the active stock, but this distribution is likely to change in the future since 50% of present student enrolments are female. As there is no historical evidence to suggest that the female labour force participation will be less than that of males, the value for active to inactive flows is assigned to zero over the forecast period.

. Attrition from Death and Retirement - Using the age distribution of current stock, a pattern of retirements over the forecast period was

TABLE IV.2.4

TOTAL ESTIMATED NUMBER OF CORRECTIVE LENSES WORN IN ALBERTA FOR 1980

AGE GROUP	PERCENTAGE OF PERSONS WITH CORRECTIVE LENSES[1]		ALBERTA POPULATION 1980[2]		ESTIMATED NUMBER OF CORRECTIVE LENSES	
	MALE	FEMALE	MALE	FEMALE	MALE	FEMALE
3 - 16	13	17	251,400	239,000	32,682	40,630
17 - 24	34	49	178,500	171,200	60,690	83,888
25 - 44	35	48	321,700	299,400	112,595	143,712
45 - 54	76	86	100,300	94,200	76,228	81,012
55 - 64	89	95	74,300	78,500	66,127	74,575
65 & over	90	95	71,800	85,300	64,620	81,035

Notes: 1. "Characteristics of Persons With Corrective Lenses," National Center for Health Statistics, United States Department of Health Education and Welfare, 1966.

2. Alberta Bureau of Statistics, projected Alberta population.

obtained by automatically retiring all ophthalmic dispensers at age 65. Due to the high joint probability of death and retirement and the small size of the occupational group, we have not made separate estimates of attrition from death.

iii Requirements

. Historical population ratio - The 1980 ratio of ophthalmic dispensers to Alberta population of 1:8,604 was used to determine the number of practitioners that would be required in the future to maintain the current level of service.

. Utilization - The measure of utilization adopted as a proxy for services provided by ophthalmic dispensers is the estimated number of corrective lenses worn. The method of estimation uses the incidence of corrective lenses by age and sex from a 1965 survey conducted by the National Center of Health Statistics in the United States, and an estimate of Alberta population in 1980, to arrive at an estimated number of corrective lenses worn in 1980. Table IV.2.4, opposite, shows the results of these calculations.

. Service target ratio - Requirements were projected for a service target ratio of ophthalmic dispensers to population of 1:10,000. The ratio is used by the Ministry of Health in Ontario to project requirements.

TABLE IV.2.5

NET REQUIREMENTS, ALBERTA, OPHTHALMIC DISPENSERS

(Incremental and Cumulative)

YEAR	Low Population Scenario						Medium Population Scenario						High Population Scenario					
	LOW		MEDIUM		HIGH		LOW		MEDIUM		HIGH		LOW		MEDIUM		HIGH	
	C	C	A	A	B	B	C	C	A	A	B	B	C	C	A	A	B	B
1981	-46	-46	-12	-12	-11	-11	-44	-44	-9	-9	-9	-9	-42	-42	-7	-7	-8	-8
1982	-12	-58	-10	-22	-10	-21	-8	-52	-7	-16	-8	-17	-9	-51	-8	-15	-8	-16
1983	-12	-70	-11	-33	-11	-32	-8	-60	-7	-23	-7	-24	-10	-61	-8	-23	-9	-25
1984	-11	-81	-11	-44	-11	-43	-9	-69	-7	-30	-8	-32	-8	-69	-7	-30	-8	-33
1985	-13	-94	-12	-56	-10	-53	-10	-79	-9	-39	-9	-41	-9	-78	-8	-38	-9	-42
1990	-67	-161	-63	-119	-60	-113	-55	-134	-49	-88	-50	-91	-47	-125	-39	-77	-43	-85
1995	-59	-220	-56	-175	-47	-160	-47	-181	-42	-130	-36	-127	-36	-161	-29	-106	-27	-112
2000	-51	-271	-48	-223	-33	-193	-38	-219	-32	-162	-19	-146	-26	-187	-19	-125	-10	-122

Requirements derived using:

A. Historical ratio approach of 1:8,604 achieved in 1980
B. Utilization approach based on estimated number of corrective lenses
C. Service target ratio approach of 1:10,000

d) Net Requirements

Table IV.2.5, opposite, shows the net manpower requirements (incremental and cumulative).

. Highlights - Based on the medium population projection, there is a surplus of manpower under each of the projection approaches used. Under the service target ratio approach, there is a surplus of 219 ophthalmic dispensers by the year 2000. Based on the utilization approach, there is a manpower surplus of 146, and following the historical ratio approach, a surplus of 162 is forecast for the year 2000.

TABLE IV.3.1

TOTAL NUMBER OF OPHTHALMIC

DISPENSERS IN SASKATCHEWAN, 1978 to 1980

YEAR	OPHTHALMIC DISPENSERS	CONTACT LENS TECHNICIANS	TOTAL
1978	52	16	68
1979	78	19	97
1980	80	23	103

Source: Saskatchewan Ophthalmic Dispensers Association. Correspondence with President, September 1980.

Notes: 1. All contact lens technicians are qualified ophthalmic dispensers.

2. Before 1978, Saskatchewan had no legislation governing the licensure of ophthalmic dispensers and contact lens technicians, thus no accurate information exists on the stock of qualified practitioners prior to that time.

3.2.3 SASKATCHEWAN

a) Legal Controls - The Ophthalmic Dispensers Act (RSS 1978 Ch O-5) defines ophthalmic dispensing as:

> "the measuring, adjusting or adopting of ophthalmic appliances to the needs of the intended wearer, for the aid or correction of visual or ocular anomalies including artificial eyes, but not contact lenses." Only licensed ophthalmic dispensers who have obtained specialized training in contact lens technique, and have passed an examination for contact lens technicians, can be registered as such, and be licensed to fit, supply and dispense contact lenses directly to a person."

The Council of the Saskatchewan Ophthalmic Dispensers Association (SODA) is empowered by the Act to administer its regulations with respect to registration, examination, discipline and complaints.

b) Insured Services

The Province of Saskatchewan does not insure eyeglasses or contact lenses, except for social assistance recipients.

c) Assumptions

i Stock

. Historical stock 1978 to 1980 - The total number of active ophthalmic dispensers licensed to practice in Saskatchewan from 1978 to 1980 is shown in Table IV.3.1, opposite. The information provided by SODA also identifies the number of ophthalmic dispensers who have obtained specialized training as contact lens technicians. Prior to 1978, Saskatchewan ophthalmic dispensers were not subject to legislation, and thus accurate information on the active stock is not available.

TABLE IV.3.2

TOTAL NUMBER OF OPHTHALMIC DISPENSERS IN SASKATCHEWAN BY AGE AND BY SEX, AS OF SEPTEMBER, 1980

AGE AND SEX GROUP	OPHTHALMIC DISPENSERS	CONTACT LENS TECHNICIANS	TOTAL
18 - 30	30	4	34
31 - 40	16	11	27
41 - 50	22	5	27
51 and over	12	3	15
Total	80	23	103
Male	57	16	73
Female	23	7	30
Total	80	23	103

Source: Saskatchewan Ophthalmic Dispensers Association. Correspondence with President, September, 1980.

Notes: 1. All contact lens technicians are qualified ophthalmic dispensers.

2. An age specific breakdown by sex was not provided.

TABLE IV.3.3

FACTORS AFFECTING MANPOWER SUPPLY

OPHTHALMIC DISPENSERS, SASKATCHEWAN

FACTOR	ASSUMPTION	SOURCE
Stock	103	S.O.D.A.
Net migration	-3 per year	S.O.D.A.
Net immigration	-2 per year	S.O.D.A.
Net occupational shifts	-1 every 3 years	S.O.D.A.
Training output	10 per year	S.O.D.A.
Active/inactive Attrition	0 per year 1980 age distribution retirement at age 65	S.O.D.A. S.O.D.A.

Note: S.O.D.A. is the Saskatchewan Ophthalmic Dispensers Association

. Current stock 1980 - The age and sex distribution of the current 1980 stock of ophthalmic dispensers and contact lens technicians is presented in Table IV.3.2, opposite.

ii Factors Affecting Manpower Supply

Table IV.3.3, opposite, shows the assumptions made with respect to each of the factors which have the potential to affect stock, that is, migration, immigration, occupational shifts, training output, active to inactive stock, and attrition.

. Net migration - Since 1978, the SODA president estimates a net loss of 3 ophthalmic dispensers per year through interprovincial migration. The net migration factor was assigned a value of minus three (-3) for the forecast period on the basis of this information.

. Net immigration - The SODA president has indicated a loss of ophthalmic dispensers to the United States since 1978 of about two per year. This rate of loss was assumed for the years 1981 to 2000.

. Net occupational shifts - In the past three years, the SODA president reports the loss of one ophthalmic dispenser to a related retail field. The net occupational shift factor was assigned a value of minus one (-1) every three

years on the basis of this information.

. Training output - The 1980 SODA records show the total first and second year enrolments of Saskatchewan students in the Canadian Guild of Ophthalmic Dispensers correspondence course to be 40. Using an attrition rate of 50% for the first year enrolments, and 33% for the second year, an estimated 7 graduates will be eligible for licensing in 1981 and 10 in 1982. A total of 10 graduates is assumed every year of the forecast period thereafter.

. Active to inactive flows - There is no inactive pool of ophthalmic dispensers in Saskatchewan according to the SODA president. Female practitioners currently account for about 34% of the active stock, but this distribution is likely to change in the future, since 80% of present student enrolments are female. There is no historical evidence to suggest that the labour force participation of female ophthalmic dispensers will be less than that of males in the future. Hence, a value of zero is assigned to this variable. SODA had no information on the number of part-time versus full-time ophthalmic dispensers. The SODA stock data treats all members as fully active.

. Attrition from death and retirement - Using the SODA age distribution of current stock, a pattern of retirements over the forecast period was

TABLE IV.3.4

TOTAL ESTIMATED NUMBER OF CORRECTIVE LENSES WORN IN SASKATCHEWAN IN 1980

AGE GROUP	PERCENTAGE OF PERSONS WITH CORRECTIVE LENSES[1]		SASKATCHEWAN PROJECTED 1980 POPULATION[2]		ESTIMATED NUMBER OF CORRECTIVE LENSES WORN IN 1980	
	MALE	FEMALE	MALE	FEMALE	MALE	FEMALE
03 - 16	13	17	116,970	111,962	15,206	19,034
17 - 24	34	49	75,078	73,070	25,527	35,804
25 - 44	35	48	123,333	117,437	43,167	56,370
45 - 54	76	86	46,899	46,477	35,643	39,970
55 - 64	89	95	44,443	46,538	39,554	44,211
65 and over	90	95	52,841	60,804	47,557	57,764

Notes:

1. "Characteristics of Persons With Corrective Lenses.", National Center for Health Statistics, United States Department of Health Education and Welfare, 1966.

2. Saskatchewan Bureau of Statistics, Series 13, Projected Saskatchewan Population.

obtained, by automatically retiring all ophthalmic dispensers reaching the age of 65. The highest probability of death occurs in the 65 and over age groupings. These practitioners, by assumption, have already been subtracted from the active stock through retirement, and therefore no attempt to estimate deaths was undertaken.

iii Requirements

. Historical population ratio - The 1980 ratio of ophthalmic dispensers to Saskatchewan population of 1:9,278 was used to determine the number of practitioners that would be required in the future, in order to maintain the present level of service.

. Utilization - The measure of utilization adopted as a proxy for services provided by ophthalmic dispensers, is the total number of corrective lenses worn per year. This method of estimation uses the incidence of corrective lenses by age and sex group, estimated in a United States 1965 survey, and an estimate of Saskatchewan population in 1980 to arrive at an estimated number of corrective lenses worn in 1980. Table IV.3.4, opposite, shows the results of these calculations.

. Service target ratio - Requirements were projected using a service target ratio of 1:10,000 ophthalmic dispensers to population.

TABLE IV.3.5

NET REQUIREMENTS, SASKATCHEWAN, OPHTHALMIC DISPENSING

(Incremental and Cumulative)

YEAR	Low Population Scenario						Medium Population Scenario						High Population Scenario					
	LOW		MEDIUM		HIGH		LOW		MEDIUM		HIGH		LOW		MEDIUM		HIGH	
	C	C	A	A	B	B	C	C	A	A	B	B	C	C	A	A	B	B
1981	-7	-7	1	1	1	1	-6	-6	1	1	1	1	-3	-3	4	4	4	4
1982	-3	-10	-3	-2	-3	-2	-3	-9	-2	-1	-2	-1	-2	-5	-1	3	-3	1
1983	-3	-13	-3	-5	-3	-5	-2	-11	-3	-4	-3	-4	-2	-7	-2	1	-2	-1
1984	-1	-14	-1	-6	-1	-6	-1	-12	0	-4	0	-4	0	-7	0	1	0	-1
1985	-3	-17	-3	-9	-3	-9	-2	-14	-2	-6	-3	-7	-2	-9	-2	-1	-2	-3
1990	-13	-30	-12	-21	-11	-20	-10	-24	-10	-16	-9	-16	-6	-15	-5	-6	-6	-9
1995	-15	-45	-15	-36	-13	-33	-12	-36	-11	-27	-9	-25	-7	-22	-6	-12	-5	-14
2000	-4	-49	-5	-41	-1	-34	-1	-37	-1	-28	3	-22	4	-18	5	-7	8	-6

Requirements derived using:

A. Historical ratio approach of 1:9,278 achieved in 1980
B. Utilization approach based on estimated number of corrective lenses
C. Service target ratio approach of 1:10,000

d) Net Requirements

Table IV.3.5, opposite, shows the net manpower requirements (incremental and cumulative).

. Highlights - Based on the medium population projection, there is a surplus of manpower under each of the projection approaches used. Under the service target ratio approach, there is a surplus of 37 ophthalmic dispensers in the year 2000. Based on the utilization approach, there is a manpower surplus of 22 while under the historical ratio approach, there is a surplus of 28.

3.2.4 MANITOBA

a) Legal Controls - An Act to Incorporate the Ophthalmic Dispensers of Manitoba defines an opthalmic dispenser as a person who:

> "prepares and dispenses lenses, spectacles, eye-glasses, etc., on the written prescriptions of duly qualified medical practitioners, or of the holders of certificates of registration under The Optometry Act; and in accordance with such prescriptions interprets, measures, adapts, fits and adjusts such lenses, spectacles, eye-glasses..... to the human face for the aid of vision, or the correction of the visual or ocular anomalies of the human eyes."

Membership to the Ophthalmic Dispensers of Manitoba is available to persons eighteen years of age and showing good moral character. No person can practice as an opthalmic dispenser in the Province of Manitoba unless he is a member in good standing with the association.

b) Insured Services

The fitting and supply of eyeglasses is not covered as an insured service under the Manitoba Health Services Commission.

TABLE IV.4.1

TOTAL NUMBER OF OPHTHALMIC DISPENSERS

IN MANITOBA, 1970 to 1979

YEAR	OPHTHALMIC DISPENSERS OF MANITOBA	MANITOBA, DEPARTMENT OF HEALTH AND COMMUNITY SERVICES, RESEARCH BRANCH
1970	60	-
1971	62	-
1972	65	-
1973	65	66
1974	65	69
1975	62	66
1976	65	69
1977	68	62
1978	61	78
1979	59	N/A

Sources: 1. Ophthalmic Dispensers of Manitoba

2. Manitoba Department of Health, Research Branch

TABLE IV.4.2

TOTAL NUMBER OF ACTIVE RESIDENT

OPHTHALMIC DISPENSERS, BY AGE AND SEX, MANITOBA, 1980

AGE GROUP	MALE	FEMALE	TOTAL
Less than 20	-	-	-
20 - 24	2	2	4
25 - 29	6	2	8
30 - 34	4	3	7
35 - 39	9	3	12
40 - 44	4	1	5
45 - 49	6	0	6
50 - 54	3	1	4
55 - 59	4	1	5
60 - 64	4	0	4
65 and over	8	0	8
Unknown	1	0	1
Total	51	13	64

Source: Ophthalmic Dispensers of Manitoba

TABLE IV.4.3

FACTORS AFFECTING MANPOWER SUPPLY

OPHTHALMIC DISPENSERS, MANITOBA

FACTOR	ASSUMPTION	SOURCE
Stock	64	ODM records
Net migration	1 per year	Information from Registrar ODM
Net immigration	0 per year	Information from Registrar ODM
Net occupational shifts	0 per year	Information from Registrar ODM
Training output	7 per year	Information from Registrar ODM
Active to inactive	0 per year	Information from Registrar ODM
Attrition	Retirement at 65 per year	Information from Registrar ODM

Notes: 1. The Ophthalmic Dispensers of Manitoba (ODM)

c) Assumptions

i Stock

. Historical stock 1970 to 1979 - The total number of active ophthalmic dispensers licensed to practice in Manitoba is shown in Table IV.4.1, opposite.

. Current stock 1980 - The age and sex distribution of the current 1980 stock of ophthalmic dispensers is shown in Table IV.4.2, opposite.

ii Factors Affecting Manpower Supply

Table IV.4.3, opposite, shows the assumptions made with respect to each of the factors which have the potential to affect stock, that is, migration, immigration, occupational shifts, training outputs, active to inactive stock and attrition.

. Net migration - Information obtained from the Registrar of the Ophthalmic Dispensers of Manitoba (ODM) indicates that over the last ten years, a net average of 1 active practitioner per year has moved into the province. The net migration variable was assigned a value of 1 for the forecast period, based on this information.

. Net immigration - The Registrar of the O.D.M. indicated that their historical records show no practitioners coming from overseas, or leaving the province to work outside of Canada. The net immigration factor has therefore been given a value of zero for the forecast period.

. Net Occupational Shifts - Based on information from the Registrar of the O.D.M., there has been no movement of ophthalmic dispensers into or from other occupations. The variable was therefore given a value of zero for the forecast period.

. Training Output - Based on the historical trend in the number of graduates in Manitoba from the correspondence course of the Canadian Guild of Ophthalmic Dispensers, we have anticipated an output of 7 graduates per year throughout the forecast period.

. Active to Inactive Flows - The records of the O.D.M. indicate that there are currently 17 inactive practitioners on the membership roster. This figure includes members who have retained their membership in the provincial guild, but have migrated to other provinces; practitioners who are no longer active in the profession through retirement; or alternatively, practitioners who are working in secondary occupations. The Registrar of the O.D.M. could not identify any trend in the movement from inactive to active, and a value of zero has been allocated to this variable.

. Attrition from Death and Retirement - Using the age distribution of active members supplied by the Registrar of the O.D.M., a pattern of retirements for the forecast period was obtained. Retirement at age 65 was assumed. The highest probability of death occurs in the age 65 plus group, and since these individuals have been assumed to retire at this age, no attempt to estimate the probability of death was made.

TABLE IV.4.4

TOTAL ESTIMATED NUMBER OF

CORRECTIVE LENSES WORN IN MANITOBA, 1980

AGE GROUP	MALE	FEMALE
03 - 16	5,287	6,590
17 - 24	9,237	12,985
25 - 44	16,777	22,640
45 - 54	12,743	14,534
55 - 64	13,676	16,277
65 +	15,540	20,995

Notes: 1. Based on: Characteristics of Persons With Corrective Lenses," National Center for Health Statistics, United States Department of Health, Education and Welfare, 1966.

2. Manitoba Bureau of Statistics, 1980 projection of population.

TABLE IV.4.5

NET REQUIREMENTS, MANITOBA, OPHTHALMIC DISPENSERS

(Incremental and Cumulative)

	Low Population Scenario						Medium Population Scenario						High Population Scenario					
YEAR	LOW		MEDIUM		HIGH		LOW		MEDIUM		HIGH		LOW		MEDIUM		HIGH	
	A	A	B	B	C	C	A	A	B	B	C	C	A	A	B	B	C	C
1981	-4	-4	-4	-4	37	37	-4	-4	-3	-3	38	38	-3	-3	-3	-3	38	38
1982	-4	-8	-3	-7	-3	34	-3	-7	-4	-7	-3	35	-4	-7	-4	-7	-3	35
1983	-2	-10	-3	-10	-2	32	-3	-10	-3	-10	-3	32	-2	-9	-2	-9	-2	33
1984	-4	-14	-3	-13	-3	29	-3	-13	-3	-13	-3	29	-4	-13	-4	-13	-3	30
1985	-5	-19	-5	-18	-6	23	-6	-19	-6	-19	-5	24	-5	-18	-5	-18	-5	25
1990	-25	-44	-24	-42	-23	0	-25	-44	-24	-43	-24	0	-25	-43	-24	-42	-23	2
1995	-26	-70	-25	-67	-26	-26	-26	-70	-25	-68	-24	-24	-25	-68	-25	-67	-24	-22
2000	-31	-101	-29	-96	-29	-55	-30	-100	-29	-97	-30	-54	-30	-98	-28	-95	-29	-51

Requirements derived using:

A. Historical ratio approach of 1:16,475
B. Utilization approach based on current values
C. Service target ratio approach of 1:10,000

iii Requirements

. Historical Population Ratio - The 1980 ratio of ophthalmic dispensers to Manitoba population of 1:16,475 was used to determine the number of practitioners that would be required in the future to maintain the present level of service.

. Utilization - The measure of utilization adopted as a proxy for services provided by ophthalmic dispensers is the total number of corrective lenses worn per year. The method of estimation uses the incidence of corrective lenses by age and sex group, estimated in a United States 1965 survey, and an estimate of 1980 Manitoba population to obtain an estimated number of corrective lenses worn in 1980. Table IV.4.4, opposite, shows the results of these calculations.

. Service Target Ratio - Requirements were projected using a service target ratio of 1:10,000 ophthalmic dispensers to population.

d) Net Requirements

Table IV.4.5, opposite, shows the net manpower requirements (incremental and cumulative).

. Highlights - Based on the medium population projection, there is a surplus of manpower under each of the projection approaches used.

Under the service target ratio approach, there is a surplus of 54 ophthalmic dispensers in the year 2000. Based on the utilization approach, there is a manpower surplus of 97, while the historical ratio approach projects a surplus of 100 ophthalmic dispensers by the year 2000.

4. TRAINING RECOMMENDATIONS

4.1 Introduction

In this section of the report, we review the various alternatives for training locations and funding arrangements for ophthalmic dispensers in Western Canada. The alternatives are evaluated using the decision process outlined above. This process follows a series of steps in a logical process, and these are discussed below.

4.2 Step 1 - Analysis of Net Manpower Requirements

The projection of net manpower requirements under each of the approaches used indicates that there is a surplus of approximately 50 to 75 ophthalmic dispensers per year throughout the projection period.

4.3 Step 2 - Determine Indicated Training Response

There are no formal college based training programs for ophthalmic dispensers in Western Canada. Instead, basic on-the-job training is provided, supplemented by a two year correspondence course under the control of the Canadian Guild of Dispensing Opticians. These programs are under the general control of the provincial associations, and as such, the provincial government Health and Education departments have little direct control over the program. This limits the potential training responses to reduce the number of ophthalmic dispensers in Western Canada.

There are unique training needs for this occupation. By the nature of the occupation, (where trainees work and study concurrently) the training needs in Western Canada are to present appropriate training material to a geographically dispersed student base. Distance and travel time precludes the development of night study community college based programs. We therefore consider that the four western provinces should consider developing one video training program (consisting of appropriate modules based on the Canadian Guild program), and make it available to each provincial association. The contemporary video training techniques have a number of advantages over the correspondence course approach, (with the related high turnover and attrition during training). In addition, modules could be developed to address ongoing professional development needs in the profession.

APPENDIX A

SCOPE AND CONTROL OF PRACTICE

OPHTHALMIC DISPENSERS/OPTICIANS: CONTROL OF PRACTICE

PROVINCE	CERTIFICATION/LICENSING/REGISTRATION			TRAINING PROGRAM/ACCREDIATION		
	Required Characteristics of Applicants	Certification Requirements	Licensing Requirements	Length of Training & Admission Requirements	Training Location	Educational Accreditation
BRITISH COLUMBIA		. Completion of Canadian Guild of Dispensing Opticians course by correspondence	. No British Columbia certification/licensing body	. Correspondence course and on-the-job training	. No schools of Ophthalmic Dispensing in British Columbia	
ALBERTA	. Resident of Alberta for 90 days prior to issuance of certificate . Good moral character	. Completion of Canadian Guild of Ophthalmic Dispensers correspondence course and 3 years experience working in an optical laboratory or dispensary . Five years experience in an optical laboratory or dispensary . Graduate of 2 year course in a School of Ophthalmic Dispensing recognized by the Board of Examiners, and one years training under supervision of certified Ophthalmic Dispensers	. Pass examinations of the Alberta Ophthalmic Dispensers Examining Board . Apply for and obtain certificate of competency from the Ophthalmic Dispensers Examining Board . Obtain certificate of competency to dispense contact lenses Register with Alberta Guild of Ophthalmic Dispensers . Mandatory annual registration	. Correspondence course and simultaneous on-the-job training	. No schools of Ophthalmic Dispensing in Alberta	
SASKATCHEWAN Ophthalmic Dispenser	. Resident of Saskatchewan . Good character	. Current registration with an association in Canada whose standards are equivalent to those prescribed by Saskatchewan . Complete course in Ophthalmic Dispensing as approved by the Saskatchewanb Ophthalmic Dispensers Association (S.O.D.A.)	. Pass examination of Board of Examiners of the Saskatchewan Ophthalmic Dispensers Association	. Two years correspondence course and simultaneous work experience with licensed ophthalmic dispenser	. By correspondence and on-the-job training	

(continued)

OPHTHALMIC DISPENSERS/OPTICIANS: CONTROL OF PRACTICE

PROVINCE	CERTIFICATION/LICENSING/REGISTRATION			TRAINING PROGRAM/ACCREDIATION		
	Required Characteristics of Applicants	Certification Requirements	Licensing Requirements	Length of Training & Admission Requirements	Training Location	Educational Accreditation
SASKATCHEWAN Contact Lens Technician	. Good character	. Complete course in ophthalmic dispensing or received waiver of such a requirement from S.O.D.A. . Complete contact lens technician course . Hold current Canadian registration with equivalent Saskatchewan regulations	. Pass contact lens technique examinations by Board of Examiners . Licensed to practice as ophthalmic dispense	. Two years correspondence course and simultaneous work experience with licensed contact-lens technician	. By correspondence and on-the-job training	
MANITOBA	. 18 years old . Good moral character	. 2 year correspondence and apprenticeship program at recognized school of Ophthalmic Dispensing recognized by council to maintain satisfactory standards . 4 years training and experience in Ophthalmic Dispensing under supervision of Ophthalmic Dispenser	. Pass examination at end of first year to enter second year of study, and another at end of second year to become licensed . Pay prescribed fee . Obtain certificate of registration . Annual renewal of license	. 2 years' correspondence program and simultaneous on-the-job training	. By correspondence and on-the-job training	

APPENDIX B

OCCUPATION BIBLIOGRAPHY

BIBLIOGRAPHY ON OPTOMETRY AND OPHTHALMIC DISPENSING

JOURNAL ARTICLES

"An Eye-Care Crisis with No End in Sight." McLean's, May, 1980.

Birchard, Clifton and Theodore Elliot. "A Re-evaluation of the Ratio of Optometrists to Population in the United States in light of Socio-economic trends in Health Care." American Journal of Optometry, 1967.

DeMairs, A. "Ophthalmic Technician Research Relevant to the Elderly Patient," Center for Gerontological Studies, July, 1980.

Fisker, E.J. "Optometrical Education in Canada." University of Waterloo.

Griffith, F.H. "The Use of Auxilliaries in Optometric Practice," The Canadian Journal of Optometry, June, 1980.

Marg E. and Ng R. "Optometrists Human and Computer Assistants," Journal of Occupational Medicine, May 1, 1972.

Mohr, C.S. "The Technician in Optometric Practice," Journal of American Optometric Association, January, 1977.

Myers, Raymond. "Optometric Manpower: An Analysis of Supply" Journal of the American Optometric Association, November, 1971.

"Optical Dispensing Problems Do Exist." Letter to the editor from the Chairman of public relations and manpower, the Ophthalmological Society of Alberta, Edmonton Journal, July 25, 1980.

Pitts, Donald G. "Workshop Committee Report on Minimum Adequate Examination, USAF Digest, September, 1969.

Schaefer, D. "Canadian Optometric Trust Fund," Canadian Journal of Optometry, Various Issues 1979 - 1980.

Schmidt, B.T. "Vision Care Services in British Columbia, Unpublished paper, 1980.

Schmidt, B.T., and M.J. Samet. "General Practice Patterns and Workload Distribution B.C. Optometrists Core Group," The Canadian Journal of Optometry, June, 1980.

Skuza, Burton H. "Health Planning and Resources Development: An Opportunity for Optometry," Journal of the American Optometric Association, February, 1976.

Soroka, Mort. "The Supply of Optometric Manpower," Journal of the American Optometric Association, 1977.

"The Eye-Glass Wars." Alberta Report, June, 1980.

"The Role of the Optometrist in Health Care Delivery." Canadian Journal of Public Health, March/April, 1975.

Woodruff, M.E. "A Comparison of Two Automated Refractors with Retinoscopic Findings in a School Screening Program," Canadian Journal of Optometry, December, 1979.

Woodruff, M.E. "Optometry an Under Utilizied Source of Assistance to the Primary Care Physician," Canadian Journal of Public Health, 1978.

Woodruff, M.E. "The Pros and Cons of Optometry in an Academic Health Center," Canadian Journal of Optometry, Autumn, 1975.

Worthen, D.M. "The Ophthalmological Optometric Interface," Symposium Legislation and the Role of the Para-professional in Eye Care, 1976.

Worthen, D.M. "The Present Scene - What can be learned from the visual care system of the British National Health Service?" Survey of Ophthalmology, July - August, 1977.

Worrell, B. "Some Approaches to the Maldistribution of Optometric Manpower" Journal of the American Optometric Association, November, 1971.

REPORTS

Aziz, J. Supply projections to 1981: Optometrists, Health and Welfare Canada, 1974.

A Proposal for Career - Ladder Training of Ocular Allied Health Personnel, American Optometric Association.

Blair, W.R.N. Report on Optometry, University of Calgary, 1976.

Bureau of Health Manpower, U.S. Department of Health Education and Welfare, 1976, Optometric Manpower Resources.

Bureau of Health Manpower, United States Department of Health, Education and Welfare, 1976. The Study of Optometrists in the United States: Current and Future.

Coates, D. Studies in the Economics of the Profession of Optometry, Phd. dissertation, The City University of New York.

Colarado Commission on Higher Education, 1978. Report to the Legislation on the Need For Optometrists.

Haffner, A. A National Study on Assisting Manpower in Optometry. Optometric Center of New York, 1971.

Health and Welfare Canada, 1977. Visision Canada.

Ministry of Health, British Columbia, 1977. Report of the Vision Care Task Force.

National Commission on Accrediatation, 1973. Report of the National Study of Optometric Education.

New England Board of Higher Education, Recommendation for Regional Action for Optometric Education in New England, 1975.

Redmond, Douglas. Analysis of Data on Optometric Students, American Optometric Association, 1976.

Redmond, D.W. Concept Development for an Information Retrieval System for Optometry and Related Manpower, American Optometric Manpower, 1972.

Report to the Multi-disciplinary Health and Planning Group of the John Hopkins University to the Maryland Comprehensive Health Planning Agency, June, 1974.

Report of the Vision Care Task Force. Ministry of Health, British Columbia, 1977.

Report of the National Study of Optometric Education. National Commission on Accrediatation, 1973.

Report of the Senate Committee, University of Waterloo, on Optometric Education in the University, 1967.

Saskatchewan Department of Continuing Education. A Review of Current Developments Having Implications for Manpower Supply in the Eye Care Field, March, 1974.

Senate Planning Committee. Proposal for a School of Optometry at the University of Victoria, 1977.

Shillington, E.R., and D.O. Anderson. Visual Care Needs and Manpower in British Columbia, Health Manpower Research Unit, U.B.C., 1974.

Task Force on Eye Care. A Report to the Nova Scotia Council of Health, 1972.

The Demand for and Supply of Professional Refractive Eye Care Services in Alabama and Surrounding States.

Vision Service Delivery in Ontario with Recommendations for Meeting the Unmet Needs for Vision Care and Rationalization of the Delivery of Vision Care Services, 1977.

BRIEFS

Alberta Optometric Association. People of Vision are Needed Here and Now, A Brife to the Legislative Assembly.

Alberta Optometric Association. The Need for the Creation of a School of Optometry in Alberta, 1978.

Canadian Association of Optometrists. A Brief Concerning A School of Optometry in a University in Western Canada, 1970.

Canadian Association of Optometrists. Presentation to Health Sciences Review, 1979.

Canadian Association of Optometrists. Submission to the House of Commons Special Committee on the Disabled and the Handicapped related to the Unmet Needs of the Visually Handicapped, September 1, 1980.

Canadian Association of Optometrists. The Role of the Optometrist in Health Care Delivery; A Guideline for Manpower Planning in the Vision and Eye Care Field, 1974.

Canadian Association of Optometrists. The Western School of Optometry Proposal: Health Manpower Implication, Conference on Optometric Education, 1973.

Canadian Association of Optometrists. Vision Care Needs and Optometric Manpower Requirements in Western Canada, In Reference to the Need for a School of Optometry to be Established in Western Canada, 1973.

Canadian Medical Association. Policies of the Canadian Ophthalmological Society on Eye and Vision Care in Canada, 1975.

Schaefer, D.N. An Annual Synopis of Activity 1970 - 1980 for the New Academic Facilities Committee of the Canadian Association of Optometrists, August 15, 1980.

School of Optometry, University of Waterloo. A Brief respecting changes in Optometric Education 1962 to 1980, Health Sciences Review, 1979.

School of Optometry, University of Waterloo. Discussion and Recommendations in Response to the Ontario Task Force Report on Health Research Requirements, 1977.

Walsh, G. The Economics of Vision Care. Canadian Association of Optometrists, for the Conference on Optometric Education, 1973.

EDUCATIONAL MATERIAL

1) Council on Optometric Education, American Optometric Association. Manual of Evaluation Procedures.

2) Council on Optometric Education American Optometric Association Manual of Evaluation Requirements and Guidelines: Professional Optometric Degree Programs.

3) University of Waterloo. Annual Calendar 1980 - 1981.

4) University of Waterloo. General Survey Correspondence 1980.

Province of
British Columbia

Province of
Alberta

Province of
Saskatchewan

Province of
Manitoba

WESTERN CANADA
HEALTH MANPOWER TRAINING STUDY

Section III- Category # 1 - Report V

CERTIFIED
PROSTHETISTS and ORTHOTISTS

REPORT V

CERTIFIED PROSTHETISTS AND ORTHOTISTS: THE REQUIREMENT FOR ALTERNATIVE TRAINING AND FUNDING ARRANGEMENTS IN WESTERN CANADA

REPORT V

CERTIFIED PROSTHETISTS AND ORTHOTISTS
THE REQUIREMENT FOR ALTERNATIVE TRAINING
AND FUNDING ARRANGEMENTS IN WESTERN CANADA

TABLE OF CONTENTS

STUDY BACKGROUND, OBJECTIVES AND APPROACH	PAGE
Study Background - General Introduction	I
Study Origins	I
Study Objective	II
Study Timing	II
Study Approach	III
1. SUMMARY AND RECOMMENDATIONS	
Introduction	1
Western Canada Overview	2
Manpower Training Recommendations	4
2. DISCUSSION OF OCCUPATION	
Definition of Occupation	5
Role	6

TABLE OF CONTENTS (Continued) PAGE

3. NET MANPOWER REQUIREMENTS

GENERAL ASSUMPTIONS 11
. Manpower Stock 11
. Factors Affecting Manpower Supply 11
. Requirements 13
. Productivity 14
. Sensitivity Analysis 14

PROVINCIAL ASSUMPTIONS

. BRITISH COLUMBIA

. Legal Controls 15
. Insured Services 15
. Assumptions 15
. Stock 15
. Factors Affecting Manpower Supply 16
. Requirements 18
Net Requirements 19

. ALBERTA

. Legal Controls 20
. Insured Services 20
. Assumptions 20
. Stock 20
. Factors Affecting Manpower Supply 21
. Requirements 23
Net Requirements 24

TABLE OF CONTENTS (Continued)

PAGE

PROVINCIAL ASSUMPTIONS (Continued)

. SASKATCHEWAN

. Legal Controls 25
. Insured Services 25
. Assumptions 25
. Stock 25
. Factors Affecting Manpower Supply 26
. Requirements 29
Net Requirements 30

. MANITOBA

. Legal Controls 31
. Insured Services 31
. Assumptions 31
. Stock 31
. Factors Affecting Manpower Supply 32
. Requirements 33
Net Requirements 34

4. TRAINING RECOMMENDATIONS 35

Appendix A - Scope And Control of Practice
Appendix B - Occupation Bibliography

STUDY BACKGROUND, OBJECTIVES AND APPROACH

STUDY BACKGROUND - GENERAL INTRODUCTION

The provision of effective health services to the community is, to a considerable degree, dependent on three essential resources:

- an adequate supply of well trained specialist staff in each health occupation group
- the development of adequate facilities to service the community
- the availability of adequate funds to ensure cost effective and efficient health services.

The range and complexity of health treatment programs has expanded greatly in Canada during the last twenty five years. In addition, changing technology and the development of new treatment programs have resulted in an increased requirement for skilled, adequately trained health manpower. These factors have resulted in an increased emphasis on manpower planning and skill training for health occupations to ensure an adequate supply of trained practitioners to meet defined manpower requirements.

STUDY ORIGINS

The Western Canada Health Manpower Training Study was initiated by the Western Premiers at their annual conference in 1980. The study is under the direction of a Steering Committee comprised of government representatives from the Provinces of British Columbia, Alberta, Saskatchewan and Manitoba. The members of the Steering Committee represent both the Health and Education departments within each provincial government.

STUDY OBJECTIVES

The study terms of reference contain two major objectives. These are:

- to assess the existing and future needs for health manpower training programs and facilities in Western Canada

- to make recommendations for the rationalization of the location and funding of health manpower training programs and facilities in Western Canada.

STUDY TIMING

The study consists of a review of 26 health occupations to be examined in five categories. The initial category consists of five occupations, selected for the study on the basis of current availability of training programs in Western Canada. Although the study is divided into five categories for review, each occupation within these is to be studied independently over the next two years. Several of the occupations are inter-related. The requirement for one kind of manpower may be influenced by that of another, yet the two occupations may not be reviewed at the same time. Therefore, the study recommendations should be reviewed once all the occupations have been studied.

STUDY APPROACH

Introduction

In order to achieve the study objectives, the work program consists of three key activities. These are:

- the analysis of manpower supply and requirements, and the calculation of net manpower requirements
- the analysis of existing training programs for Western Canada
- the development of recommendations for alternative training locations and funding arrangements

Analysis of Manpower Supply and Requirements

The analysis of manpower supply and requirements is designed to allow for a variety of data inputs, and for different emphasis depending on the occupation under review. A variety of data sources are used including provincial and national associations, health insurance agencies, and provincial health and education departments. In all instances, data is developed independently of previously published sources.

In addition to the basic projection of net manpower requirements, a number of sensitivity analyses have been completed to assess the impact of changes in the factors affecting supply and requirements, prior to developing recommendations for either additional training programs, or expanding existing training programs.

Approaches to Determining Manpower Requirements

The approach developed to determine manpower requirements uses three methods of projection. These are discussed below.

1. Service Utilization Approach

The utilization approach is based on an analysis of the pattern of health service usage. It establishes trends in service utilization and projects these onto future population estimates. There are three steps in the service utilization approach.

Step 1 - Determine Per Capita Utilization Rate

Historical data of the number of services provided, by age and sex of recipient is derived. The number of services per age/sex group is then divided by the population for that group in the corresponding year. This results in a per capita utilization rate.

Step 2 - Project Future Service Required

The per capita utilization rate is projected onto the low, medium and high population for each year from 1981 to 2000. This results in an estimate of total future services.

Step 3 - Estimated Number of Practitioners Required

Having determined the total future services, the model projects the number of practitioners required, by assuming a constant level of services per practitioner. The number of services per

practitioner is determined by dividing total services by the number of practitioners in the base year. To estimate the required number of practitioners, the model divides total future services required by the number of services per practitioner.

2. Service Target Ratio Approach

Service target ratios reflect a theoretical optimal manpower level required to meet health service requirements in the occupation under review. They are expressed as the ratio of practitioner to population. The service target ratios are derived based on discussion with health authorities, review of published reports, articles and summary of defined health care needs.

3. Population Ratio Approach

Population ratios are derived by dividing the total population at a specified point in time by the number of active practitioners. This results in a ratio of practitioners to population.

These ratios are analysed to determine if any trends exists. To project future manpower requirements, the model divides total projected population by the previously determined population ratio.

EXAMPLE 1

TABLE

NET REQUIREMENTS

(Incremental and Cumulative)

YEAR	Low Population Scenario						Medium Population Scenario						High Population Scenario					
	LOW		MEDIUM		HIGH		LOW		MEDIUM		HIGH		LOW		MEDIUM		HIGH	
	B	B	A	A	C	C	B	B	A	A	C	C	B	B	A	A	C	C
1981	1	1	1	1	6	6	1	1	1	1	7	7	4	4	4	4	10	10
1982	-1	0	-1	0	-1	5	-1	0	-1	0	-1	6	-1	3	0	4	0	10
1983	-2	-2	-2	-2	-2	3	-1	-1	-1	-1	-1	5	-1	2	-2	2	-1	9
1984	-3	-5	-4	-6	-3	0	-3	-4	-3	-4	-3	2	-2	0	-2	0	-2	7
1985	8	3	8	2	8	8	9	5	8	4	9	11	9	9	9	9	9	16
1990	0	3	0	2	0	8	2	7	3	7	3	14	6	15	7	16	7	23
1995	-12	-9	-12	-10	-12	-4	-8	-1	-9	-2	-9	5	-4	11	-5	11	-4	19
2000	-10	-19	-11	-21	-10	-14	-6	-7	-7	-9	-7	-2	-2	9	-2	9	-2	17

Requirements derived using:

A. Historical ratio approach of 1:10,621 achieved in 1976
B. Utilization approach using curent services. No productivity
C. Service target ratio approach of 1:10,000

Summary of Approaches to Projecting Manpower Requirements

The three approaches outlined above have been used for the calculation of manpower requirements for this occupation. The specific application of each approach to this occupation is discussed under Requirements (Section 3.1.3 below).

Presentation of Provincial Net Manpower Requirements

At the conclusion of each provincial section of this report, Section (d) summarizes net manpower requirements, and shows both the incremental and cumulative requirement for each approach within three population scenarios. Example 1, opposite, shows a typical net requirement table.

The table is divided into three sections, low, medium, and high population scenarios. Within each section, low, medium, and high manpower requirement estimates are shown. The manpower requirement approach used to derive these is identified by a letter (A,B,C), which refers to the footnotes. Within each approach, two set of figures are shown for each time point. The left hand column shows the incremental net requirement, and the right hand column shows the cumulative net requirement.

Analysis of Existing Training Programs in Western Canada

This initial study category is composed of occupations for which there are currently no training programs in Western Canada. As part of this initial study we have, however, developed a basic approach for analysing existing training programs for subsequent occupation categories.

Development of Recommendations for Alternative Training Locations and Funding Arrangements

We have developed a decision process to assist in developing recommendations for alternative training location(s) and funding arrangements. This process is designed to allow for the logical, consistent evaluation of a range of training alternatives.

There are seven steps in the decision process:

- Step 1. Analysis of manpower requirements
- Step 2. Identification of the appropriate type(s) of training
- Step 3. Definition of alternative training locations
- Step 4. Evaluation of alternative locations for new programs
- Step 5. Establishment of timing of training program requirement
- Step 6. Recommendation on training action(s) and location(s)
- Step 7. Recommendation on funding alternative(s)

Recommendations for future training location and funding arrangements specific to this occupation are discussed in Section 4, below.

EXHIBIT 1 - NET MANPOWER REQUIREMENTS
CERTIFIED PROSTHETISTS AND ORTHOTISTS
WESTERN CANADA REGION, 1981 to 2000

MEDIUM POPULATION PROJECTION

YEAR	Population Ratio		Utilization		Service Target	
	Incremental	Cumulative	Incremental	Cumulative	Incremental	Cumulative
1981	-4	-4	-3	-3	-4	-4
1982	4	0	4	1	4	0
1983	1	1	3	4	2	2
1984	4	5	3	7	3	5
1985	-4	1	-4	3	-4	1
1990	-8	-7	-9	-6	-8	-7
1995	-16	-23	-16	-22	-18	-25
2000	-9	-32	-9	-31	-8	-33

1. SUMMARY AND RECOMMENDATION

1.1 INTRODUCTION

This report addresses the projected net manpower requirement for certified prosthetists and orthotists in the provinces of British Columbia, Alberta, Saskatchewan and Manitoba, for the period 1981 to 2000.

The study process begins with an assessment of the current stock of certified prosthetists and orthotists in each province, and of the factors likely to influence this stock in the future. The net requirement for certified prosthetic and orthotic manpower over the projection period is obtained from a comparison of projected manpower supply and requirements.

For each province and the Western Region, the projected future net requirements for certified prosthetists and orthotists are subjected to a sensitivity analysis in order to determine the importance of underlying assumptions to the net result. The last step of the study process is to determine the requirement for alternative locations and funding arrangements for the training of certified prosthetists and orthotists in Western Canada. The recommendations concerning training are summarized below.

The study terms of reference limited the analysis of net manpower requirements to discussion of the net manpower requirements for certified prosthetists and orthotists. We have not analysed the supply and requirement for prosthetic and orthotic technicians.

1.2 WESTERN CANADA OVERVIEW

Exhibit 1 shows the manpower requirements for certified prosthetists and orthotists for Western Canada. The requirements have been derived using the medium population projection, and represent three alternative scenarios. These are net manpower requirements based on:

1. the current population ratio

2. the target ratio of 1 practitioner for 140,000 population

3. current level of service utilization with no increase in productivity

In each of the above, net manpower requirements were derived for each province, and these have been combined to determine the net requirements for Western Canada.

Highlights

Under each of the projection approaches used, there is a requirement for additional certified prosthetists and orthotists until 1985, followed by a surplus of manpower from 1985 to 2000.

The Relationship Between Certified Prosthetists, Orthotists, and Technicians

At present, the registration and certification of the certified prosthetist/orthotist is controlled by the Canadian

Board for Certification of Prosthetists and Orthotists (C.B.C.P.O.).

In order to be eligible for acceptance to write examinations for certification, candidates must have completed two years of technical training in a school of orthotics and prosthetics, plus three years of practical experience in the field, or have completed five years of practical experience as a prosthetic or orthotic technician, supplemented by technical programs. By 1985, candidates will be required to complete a C.B.C.P.O. approved program of 2 years in a college-based program and one year clinical experience, and have at least 24 months of practical experience.

The program in prosthetics and orthotics at the British Columbia Institute of Technology has been established to train at the technician level. The current enrolment plans are for ten people every second year. Currently, British Columbia will place five people in the program, Alberta will place two, and Saskatchewan will place three.

Essentially, the stock of technicians form a nucleus from which certified practitioners qualify. In this study, we have not examined the net requirements for technician manpower. Based on the assumption that 70% of the technicians graduating from the British Columbia Institute of Technology will subseqently complete three years of practical experience, and meet the requirements for certification established by the C.B.C.P.O., we project a limited requirement for additional practitioners until 1985, and a potential surplus after this date. Under the assumption that only 50% of technicians will

meet the requirements for certification there remains the potential for a limited surplus after 1985.

1.3 MANPOWER TRAINING RECOMMENDATIONS

- That enrolment in the program for prosthetics and orthotics at the British Columbia Institute of Technology not be increased above the present level.

- That the supply and needs for certified orthotists and prosthetists be monitored to control program enrolments and minimize surplus manpower.

2. DISCUSSION OF THE OCCUPATION: CERTIFIED PROSTHETISTS AND ORTHOTISTS

2.1 DEFINITION OF CERTIFIED PROSTHETISTS/ORTHOTISTS

A certified prosthetist/orthotist:

> Designs, builds, fits and repairs prosthetic and orthotic appliances to correct physical defects of human body. Interprets physician's specifications for prosthesis (artificial limb) or orthosis (support or brace). Measure patient for appliance. Designs or draws working sketch or model of prosthesis or orthosis required. Builds or directs other workers to build prosthetic or orthotic appliance, using materials, such as, plastic, wood, leather, steel, aluminium and padding and machine-and hand-tools. Fits patient with appliance and adds or removes padding, adjust parts and changes tension to achieve maximum comfort and optimum function. Revises working sketch to reflect changes and direct other workers to modify appliance. Advises patient in application, use and care of appliance. Services and repairs appliance as necessary.[1]

Elaboration of Definition

Prosthetics may be defined as the practice of providing health care services to patients with a partial or total absence of limbs or other external body components through assessment, measuring, fabricating, fitting and dispensing of devices known as prostheses.

Orthotics may be defined as the practice of providing health care services to patients with disabling conditions of the anatomy through the measuring, fabricating, fitting and dispensing of externally applied appliances know as orthoses.

1. Canadian Classification and Dictionary of Occupations, 1971 No. 3159-110.

2.2 ROLE

2.2.1 Historical Evolution

The practice of prosthetics and orthotics has its origins in early medicine. The use of devices to assist human movement has been recognized as an important component in health care. To a degree, the use of prosthetic and orthotic devices is related to the incidence of war, and the occupation expanded rapidly in Canada in the post-Second World War period. In the past twenty five years, prosthetics engineering and design has improved dramatically; new plastics, metals and fibres have been introduced and generally the field of human movement and bio-medical engineering has expanded. The most recent advances in micro-electrical circuitry have important long term implications.

2.2.2 Function

In addition to the rapidly expanding technology of orthotics and prosthetics, the role of the qualified orthotist and prosthetist has also expanded considerably. It is now common for the orthotist/prosthetist to be considered as a member of the medical management team. This approach was documented in a paper entitled "The Clinic Method of Delivery of Health Care Services in Prosthetic and Orthotic Work", delivered to the Interprovincial Committee on Prosthetic and Orthotic Operations. The concept centers around the multi-disciplinary interaction of a team of specialists. Each member of the team is responsible for patient care within the individual area of expertise, and is responsible for the integration of patient care with those of the other team members.

Within this broad concept, the certified orthotist or prosthetist takes part in the rehabilitation program, by assisting with both pre-surgical planning, and advising on post-surgical prosthetic management by preparing the most suitable appliances. The orthotist/prosthetist is responsible for the orthotic/prosthetic device, the selection of all components, the appropriate use of materials, the cosmetic appearance, and the quality of fit of the device to the patient. The certified orthotist/ prosthetist provides supervision and support for the orthotic/prosthetic technician, and conducts internship training for orthotists and prosthetists.

2.2.3 Contribution to Continuum of Health Care Delivery

Prosthetic and orthotic devices are paid for by government programs in Alberta, Saskatchewan and Manitoba. The underlying philosophy is that prosthetic and orthotic devices are designed to maximize the potential mobility of the individual, and to minimize the potential for disrupted normal movement. As such, the occupation plays an important role in ensuring the proper functioning of individuals with either birth defects, or alternatively with limited mobility as a result of illness or accident.

2.2.4 Education

The registration and certification of the orthotic/ prosthetic practitioner is controlled by the Canadian Board for Certification of Prosthetists and Orthotists.

There are currently three programs for technician training in Canada, and one program for clinicians. These programs are located in Quebec, British Columbia and Ontario.

Quebec

The School of Prosthetics and Orthotics of Quebec Inc. is located in Montreal and affiliated with the Universities of Montreal and McGill. The Quebec government is currently evaluating the program with the intention of incorporating it within the community college system. The present program offers a two year diploma program in prosthetics, a two year diploma program in orthotics, and a three year combined diploma program in orthotics and prosthetics.

British Columbia Institute of Technology

The recently instituted program in prosthetics and orthotics currently consists of a two year program at the technician level. It combines lecture with practical bench experience, through a series of clinical placements in the Vancouver area. The current enrolment plans are for 10 people to enroll every second year. Currently, British Columbia will place five people on the program, Alberta will place two people, and Saskatchewan will place three.

George Brown College, Ontario

Two programs are currently offered by George Brown College in Toronto. These are:

- prosthetic/orthotic technician. A course of two years duration, plus twenty months of field experience. The program graduates 15 students per year.

- prosthetic/orthotic practitioner. A course of two years duration, plus a 1 year internship. The planned graduation is for 7 students per year. This program is to be transferred to the West Park Hospital and will use the facilities of the Chedoke McMaster Medical Centre and the Crippled Children's Centre in Toronto. The program capacity will be expanded to 12 students in 1983, and to 16 in 1985.

In addition to these formal college-based programs, training material is made available through the Vo-Tech audio visual program. This program is currently widely used in Manitoba for on-the-job training.

In order to be eligible for acceptance to write examinations for certification as an orthotist or prosthetist candidates must:

- have completed two years of technical training in a School of Prosthetics or Orthotics, plus three years of practical experience in the field.

- or have completed five years of practical experience.

These requirements will change in the next five years, as the existing training programs and structures are formalized. By 1985, candidates will be required to complete a C.B.C.P.O. approved clinical prosthetic and/or orthotic program of at least two years duration, plus 24 months of practical experience.

TABLE V.0.1

TOTAL NUMBER OF CERTIFIED PROSTHETISTS AND ORTHOTISTS IN WESTERN CANADA, 1970 - 1980

YEAR	BRITISH COLUMBIA[1]	ALBERTA[2]	SASKATCHEWAN[3]	MANITOBA[4]
1970	-	-	9	-
1971	-	-	7	-
1972	-	-	9	-
1973	-	-	9	4
1974	-	-	8	5
1975	-	-	8	8
1976	-	-	7	10
1977	12	-	7	9
1978	14	17	10	10
1979	14	18	9	8
1980	15	19	9	11

Notes:
1. British Columbia Health Manpower Research Unit
2. Alberta Association of Prosthetists and Orthotists
3. Wascana Hospital and Saskatchewan Council for Crippled Children and Adults
4. Manitoba Association of Prosthetists and Orthotists

TABLE V.0.2

FACTORS AFFECTING MANPOWER SUPPLY OF

CERTIFIED PROSTHETISTS AND ORTHOTISTS, WESTERN CANADA

FACTOR	BRITISH COLUMBIA	ALBERTA	SASKATCHEWAN	MANITOBA
Opening stock	15	19	9	11
Net migration	1 every 2 years	0	0	-1 every 2 years
Net immigration	0	0	1 every 10 years	0
Net occupational shifts	0	0	0	0
Training output	1 every 2 years 1980-85, 3 grads every 2 years 1985-2000	1 every 2 years 1980-2000	2	1
Active/ inactive flows	0	0	0	0
Attrition	1980 age distribution;retirement at 65	1980 age distribution;retirement at 65	1980 age distribution;retirement at 60	1980 age distribution;retirement at 65

3. NET MANPOWER REQUIREMENTS

3.1 GENERAL ASSUMPTIONS

3.1.1 Manpower Stock

The total number of certified prosthetists/orthotists in Western Canada from 1970 to 1980 is shown in Table V.0.1, opposite. Currently there are approximately 55 practitioners in Western Canada.

3.1.2 Factors Affecting Manpower Stock

Table V.0.2, opposite, shows the assumption made with respect to each of the factors which have the potential to affect stock, that is migration, immigration, occupational shifts, training output, active to inactive movements, and attrition. A discussion of each of these factors follows.

- Net Migration

  Net migration (per year) is positive in British Columbia, negative in Manitoba and zero in Alberta and Saskatchewan. Based on information obtained from the associations, this occupation experiences a high degree of mobility, and, although the net migration figures indicate limited movement, the migration rates should be closely monitored in the future to reflect actual manpower movements.

- Net Immigration

Few certified prosthetists and orthotists enter or leave Canada each year. Based on historical trends, only Saskatchewan indicated any immigration.

- Net Occupational Shifts

Based on interviews with the professional associations, we concluded that occupational shift is an insignificant factor in determining manpower supply of this occupation.

- Active to Inactive

Based on interviews with professional associations, we concluded that movement from active to inactive status is an insignificant factor in determining manpower supply of this occupation.

- Training Output

The requirements for certification by the Canadian Board of Certification for Prosthetists and Orthotists (C.B.C.P.O.) dictate the potential numbers of trained practitioners entering the work force. The basic route is to either graduate from the technicians programs at British Columbia Institute of Technology or George Brown College in Toronto, and to spend two years in qualifying practical experience. We have assumed that 70% of the technician graduates will subsequently be certified by the C.B.C.P.O.

. Attrition

The age distribution indicates that 48% of the current stock will retire over the next 20 years. We have not estimated attrition through death because of the small size of the stock, and the high joint probability of death and retirement.

3.1.3 Requirements

. Historical Ratios

The current ratios of certified orthotists and prosthetists to population in each province were used to project requirements.

. Utilization

Information on prosthetic and orthotic issues and repairs were available from Manitoba and Saskatchewan. The age-sex utilization rates developed from the Saskatchewan Aids to Independent Living Program were used for Alberta and British Columbia. The Saskatchewan age distribution of these services was applied to the actual number of services provided under the Manitoba Health Service Commission, to obtain an age distribution of services.

. Service Target Ratio

A service target ratio of 1:140,000 was projected

for all provinces, as recommended by the Western Canada Post-Secondary Education Committee.

3.1.4 Productivity

Productivity has a potential impact on this profession, and sensitivity projections were made assuming a 1.5% productivity improvement per annum cumulative for 20 years. This was found to have little impact on net manpower requirements.

3.1.5 Sensitivity Analysis

Because of the indicated surplus of certified prosthetists and orthotists under each of the approaches used to determine net manpower requirements, only limited sensitivity analysis was undertaken.

In addition to the assumption on productivity, additional analysis was undertaken assuming a rate of 50% certification for the graduates of the British Columbia Institute of Technology technician program. This reduced the surplus of manpower to 16 in the year 2000.

TABLE V.1.1

TOTAL NUMBER OF CERTIFIED PROSTHETISTS AND ORTHOTISTS IN BRITISH COLUMBIA, 1977 to 1979

YEAR	HEALTH MANPOWER RESEARCH UNIT	CANADIAN BOARD FOR CERTIFICATION OF PROSTHETISTS/ORTHOTISTS
1977	12	-
1978	14	-
1979	14	13

Notes:
1. The count by the Health Manpower Research Unit includes active prosthetists/orthotists who have met the requirements of the Canadian Board for the Certification of Prosthetists and Orthotists. The sources are the Report on Prosthetic and Orthotic Manpower in British Columbia 1978, and Roll Call 1979.
2. The Canadian Board for the Certification of Prosthetists/Orthotists includes certified personnel resident in British Columbia who are members in good standing.

3.2 PROVINCIAL ASSUMPTIONS

3.2.1 BRITISH COLUMBIA

a) Legal Controls

No provincial legislation governing the right to practice prosthetics and orthotics exists in British Columbia.

b) Insured Services

Prosthetics and orthotics are not insured by the Medical Services Plan of British Columbia. Various organizations including the Insurance Corporation of British Columbia, service clubs, hospitals, Blue Cross and Workman's Compensation Board pay for prosthetic and orthotic devices.

c) Assumptions

i Stock

. Historical stock 1977 to 1979 - The total number of prosthetists and orthotists in British Columbia from 1977 to 1979 is found in Table V.1.1 opposite. The count from the Health Manpower Research Unit includes all certified prosthetists and orthotists active in the province, whereas the Canadian Board for the Certification of Prosthetists and Orthotists only lists members in good standing. In the analysis of historical manpower stock, we have used the data from the Health Manpower Research Unit.

TABLE V.1.2

AGE DISTRIBUTION OF CERTIFIED PROSTHETISTS AND ORTHOTISTS ACTIVE IN BRITISH COLUMBIA

AGE GROUP	NUMBER
20 - 29	4
30 - 39	2
40 - 49	-
50 - 59	8
60+	1
Total	15

Source: British Columbia Association of Prosthetists and Orthotists

TABLE V.1.3

FACTORS AFFECTING MANPOWER SUPPLY OF CERTIFIED PROSTHETISTS/ORTHOTISTS, BRITISH COLUMBIA

FACTOR	ASSUMPTION	SOURCE
Opening stock	15	CBCPO Registry[1]
Net migration	1 every second year	Interview with BCAPO president[2]
Net immigration	0	Interview with BCAPO president
Net occupational shifts	0	Interview with BCAPO president
Training output	1 graduate every other year to 1984 3 graduates every other year from 1985 to 2000	Interview with BCIT[3]
Active to inactive	0	
Attrition	1980 age distribution and retirement at 65	CBCPO Registry

Notes: 1. Canadian Board for Certification of Prosthetists/Orthotists.

2. British Columbia Association of Prosthetists and Orthotists.

3. British Columbia Institute of Technology.

. Current stock 1980 - The most recent information regarding the stock of active prosthetists and orthotists was obtained from the Canadian Board for the Certification of Prosthetists and Orthotists. There are 15 certified personnel, all of whom are males. The age distribution of certified prosthetists and orthotists active in British Columbia is displayed in Table V.1.2, opposite.

ii Factors Affecting Manpower Supply

Table V.1.3, on the following page, shows the assumptions made with respect to each of the factors which have the potential to affect stock, that is, migration, immigration, occupational shifts, training output, active to inactive movements, and attrition. Each of these factors is discussed in more detail in the following sections.

. Net migration - The President of the Association indicated that British Columbia gains 1 certified prosthetist/orthotist every second year due to migration. Consequently, this rate of net migration is assumed to continue for 1981 to 2000.

. Net immigration - Except for the prosthetics and orthotics instructor hired recently by BCIT, the President of the Association was not aware of any certified personnel immigrating to or emigrating from Alberta. Since the instructor

will not be in active practice, we have assigned this factor a value of zero.

. Net occupational shifts - There is no scope for workers in a related occupation to shift into prosthetics and orthotics without completing the on-the-job training program. As well, the BCAPO reports no shifts out of the profession, thus the rate of net occupational shifts is assumed to be zero.

. Training output - Based on conversations with the Association, it is assumed that 1 technician every other year until 1984 will meet the requirements of the Canadian Board for Certification of Prosthetists and Orthotists hereinafter CBCPO). By 1985, completion of a CBCPO approved program in prosthetics and orthotics will be required plus 2 years of practical experience. If 5 residents of British Columbia are accepted into the three year program at the British Columbia Institute of Technology (hereinafter BCIT) every other year, starting in 1980, an estimated 3 prosthetists/ orthotists will be certified in British Columbia every other year from 1985 to 1990.

. Active to inactive flows - Except for the instructor at BCIT, the President of the Association indicated that there is no inactive pool of prosthetists/orthotists in British Columbia. In fact, all practitioners are working full-time. Currently, all certified personnel are

TABLE V.1.4

ESTIMATED NUMBER OF PROSTHETIC ISSUES AND REPAIRS,

BRITISH COLUMBIA, 1979

ON THE BASIS OF SASKATCHEWAN EXPERIENCE

AGE GROUPS	1979 SASK. ISSUES AND REPARIS	SASK. ISSUES AND REPAIRS PER CAPITA	B.C. PROJECTED POPULATION 1979 (000)	ESTIMATED 1979 B.C. ISSUES AND REPAIRS
00 - 19	1,307	.00384	826.6	3,174
20 - 64	2,056	.00407	1520.5	6,188
65 - 74	437	.00655	172.1	1,127
75 & over	309	.00702	104.1	731

Notes: 1. Saskatchewan Health, Aids To Independent Living Plan. Correspondence, September 1980.

2. Derived using projected Saskatchewan population, 1979, Saskatchewan Bureau of Statistics, Projection 13.

3. British Columbia Ministry of Industry and Small Business Development, Central Statistics Bureau, Projection 51.

male. If women enter the BCIT program, the future stock may be affected by the age-sex distribution, if female labour force participation is less than that of males. As there are presently no women practicing in British Columbia, the value for active to inactive flow is assigned to 0 over the forecast period.

. Attrition from death and retirement - Attrition from retirement was based on the 1980 age distribution, and estimated by assuming retirement at 65. Due to the high joint probability of death and retirement, and the small size of the occupational group, separate estimates of attrition from death were not undertaken.

iii Requirements

. Historical population ratio - The 1980 ratio of prosthetists/orthotists to British Columbia population of 1:184,107 was used to determine the practitioners that would be required in the future to maintain the current level of services.

. Utilization - As prosthetics and orthotics are not insured services in British Columbia, no data is available on age-sex utilization rates. The rates reported by the Saskatchewan Aids to Independent Living Program were used to determine British Columbia utilization rates. The estimated number of prosthetic issues and repairs is shown in Table V.1.4, opposite.

TABLE V.1.5

NET REQUIREMENTS, BRITISH COLUMBIA, CERTIFIED PROSTHETISTS/ORTHOTISTS

(Incremental and Cumulative)

YEAR	Low Population Scenario						Medium Population Scenario						High Population Scenario					
	LOW		MEDIUM		HIGH		LOW		MEDIUM		HIGH		LOW		MEDIUM		HIGH	
	A	A	B	B	C	C	A	A	B	B	C	C	A	A	B	B	C	C
1981	-2	-2	-2	-2	3	3	-1	-1	-1	-1	3	3	-1	-1	-1	-1	3	3
1982	1	-1	1	-1	0	3	0	-1	0	-1	0	3	0	-1	0	-1	1	4
1983	-1	-2	-1	-2	0	3	-1	-2	-1	-2	0	3	-1	-2	-1	-2	-1	3
1984	0	-2	0	-2	0	3	0	-2	0	-2	0	3	1	-1	1	-1	1	4
1985	-3	-5	-3	-5	-3	0	-2	-4	-2	-4	-2	1	-3	-4	-3	-4	-3	1
1990	-6	-11	-5	-10	-5	-5	-6	-10	-6	-10	-5	-4	-5	-9	-5	-9	-5	-4
1995	-8	-19	-8	-18	-8	-13	-7	-17	-7	-17	-8	-12	-8	-17	-8	-17	-7	-11
2000	-5	-24	-5	-23	-5	-18	-5	-22	-5	-22	-4	-16	-4	-21	-4	-21	-4	-15

Requirements derived using:

A. Historical ratio approach of 1:184,107 achieved in 1980
B. Utilization approach based on estimated number of devices
C. Service target ratio approach of 1:140,000

. Service target - Service target requirements were projected using a target ratio of 1:140,000 as recommended by the Western Canada Post-Secondary Education Committee.

d) Net Requirements

Table V.1.5, opposite, shows the net manpower requirements (incremental and cumulative).

. Highlights

Based on the medium population scenario, there is a surplus of manpower under each of the projection approaches used.

Under the historical ratio approach, there is a surplus of 22 certified prosthetists and orthotists in the year 2000. This same figure is obtained under the utilization approach. Under the service target approach there is a surplus of 16.

TABLE V.2.1

TOTAL NUMBER OF CERTIFIED PROSTHETISTS

AND ORTHOTISTS IN ALBERTA, 1978 to 1979

YEAR	ALBERTA SOCIAL SERVICE AND COMMUNITY HEALTH[1]	ALBERTA ASSOCIATION OF PROSTHETISTS AND ORTHOTISTS	CANADIAN BOARD FOR CERTIFICATION OF PROSTHETISTS/ ORTHOTISTS[2]
1978	17	17	-
1979	-	18	12

Notes: 1. The count by Alberta Social Services and Community Health includes active prosthetists/orthotists who have met the requirements of the Canadian Board for the Certification of Prosthetists and Orthotists. The source is the 1978 Status Report on Prosthetists and Orthotists.

2. The Canadian Board for the Certification of Prosthetists and Orthotists includes certified personnel resident in Alberta who are members in good standing. The data was obtained from the 1979 and 1980 registers.

3.2.2 ALBERTA

a) Legal Controls

There is no legislation in Alberta governing the practice of prosthetics and orthotics.

b) Insured Services

Prosthetic and orthotic devices are included in the Aids to Daily Living Program. The program was set up in April, 1980, to meet the special needs of residents who are handicapped or chronically ill, by supplying without charge, medical appliances, supplies and equipment. A wide range of prosthetic and orthotic devices are covered with the exception of low cost items. Policies on the replacement of devices are currently being developed. Previously, many prosthetic and orthotic services were insured through Alberta Blue Cross.

c) Assumptions

i Stock

. Historical stock 1978 to 1979 - The total number of active prosthetists and orthotists in Alberta for 1978 and 1979 is shown in Table V.2.1, opposite. The count provided by Alberta Social Services and Community Health, and the Alberta Association of Prosthetists and Orthotists

TABLE V.2.2

AGE DISTRIBUTION OF CERTIFIED PROSTHETISTS AND ORTHOTISTS ACTIVE IN ALBERTA, 1980

AGE GROUP	NUMBER
Less than 35	3
35 - 39	2
40 - 44	0
45 - 49	3
50 - 54	3
55 - 59	1
60 and over	4
Unknown	3
Total	19

Note: The 1980 age distribution of certified prosthetists and orthotists was provided by the Canadian Board for Certification of Prosthetists and Orthotists.

TABLE V.2.3

FACTORS AFFECTING THE SUPPLY OF CERTIFIED PROSTHETISTS AND ORTHOTISTS IN ALBERTA

FACTOR	ASSUMPTION	SOURCE
Opening stock	19	CBCPO registry[1]
Net migration	0	Interview with President of AAPO[2]
Net immigration	0	Interview with President of AAPO
Net occupational shifts	0	Interview with President of AAPO
Training output	1 graduate every 2nd year to 2000	Interview with President of AAPO Interview with BCIT[3]
Active to inactive flows	0	Interview with President of AAPO
Attrition	1980 age distribution and retirement at 65	CBCPO registry

Notes: 1. Canadian Board for Certification of Prosthetists and Orthotists

2. Alberta Association of Prosthetists and Orthotists

3. British Columbia Institute of Technology

includes all certified prosthetists and orthotists active in the province, whereas the Canadian Board for Certification of Prosthetists and Orthotists only lists members in good standing. In the analysis of historical manpower stock, we have assumed 17, and 18 practitioners for 1978 and 1979, respectively.

. Current stock 1980 - The most current information regarding the stock of active prosthetists and orthotists was obtained from the Canadian Board for Certification of Prosthetists and Orthotists. There are 19 certified personnel all of whom are male. The age distribution of certified prosthetists and orthotists active in Alberta is presented in Table V.2.2, opposite.

ii Factors Affecting Manpower Supply

Table V.2.3, opposite, shows the assumptions made with respect to each of the factors which have the potential to affect stock, that is, migration, immigration, occupational shifts, training output, active to inactive movements, and attrition. Each of these factors is discussed in more detail in the following sections.

. Net migration - The President of the Association indicated that interprovincial movements of certified prosthetists and orthotists

have generally balanced out. As a result, a zero rate of net migration is assumed.

. Net immigration - As the President of the Association was not aware of any certified personnel immigrating to or emigrating from Alberta, this factor is assigned a value of zero.

. Net occupational shifts - There is no scope for workers in a related occupation to shift into prosthetics and orthotics without completing the 5 year on-the-job training program. As well, there have been no shifts out of the profession. Consequently, the rate of net occupational shifts is assumed to be zero.

. Training output - Based on conversations with the President of the Association, 1 technician is assumed to meet the requirements of the Canadian Board for Certification of Prosthetists and Orthotists (CBCPO) in 1981 and 1983. By 1985, completion of a CBCPO approved program in prosthetics and orthotics will be required, plus 2 years of practical experience. If 2 Alberta residents are accepted into the 3 year BCIT program every other year starting in 1980, we estimate that 1 prosthetists/orthotists will be certified in Alberta every other year from 1985 to 2000.

. Active to inactive flows - The President of the Association indicated that there is no inactive

pool of prosthetists and orthotists in Alberta. Currently, all certified personnel are male, if women enter the BCIT program, the future stock may be affected by the age-sex distribution if female labour force participation is less than males. As there are presently no women practicing in Alberta, the value for active to inactive flows is assigned to zero over the forecast period.

. Attrition from death and retirement - We estimated attrition from retirement based on the 1980 age distribution and retirement at 65. Due to the high joint probability of death and retirement and the small size of the occupational group, we have not made separate estimates of attrition from death.

iii Requirements

. Historical population ratio - The 1980 ratio of prosthetists and orthotists to Alberta population of 1:118,735 was used to determine the number of practitioners that would be required in the future to maintain the current level of service.

. Utilization - Data is not yet available from the Aids to Daily Living Program, hence, the age-sex utilization rates from the Saskatchewan Aids to Independent Living Program were used to estimate Alberta utilization rates. The estimated

TABLE V.2.4

ESTIMATED NUMBER OF PROSTHETIC

ISSUES AND REPAIRS, ALBERTA, 1979

BASED ON SASKATCHEWAN EXPERIENCE

AGE GROUPS	1979 SASK. ISSUES AND REPAIRS[1]	SASK. ISSUES AND REPAIRS PER CAPITA[2]	ALTA. PROJECTED POPULATION 1979[3]	ESTIMATED 1979 ALTA. ISSUES AND REPAIRS
00 - 19	1,307	.00384	723,000	2,776
20 - 64	2,056	.00407	1,143,800	4,655
65 - 74	437	.00655	94,200	617
75 and over	309	.00702	57,800	406

Notes: 1. Saskatchewan Health, Aids To Independent Living Plan. Correspondence, September 1980.

2. Derived using the projected Saskatchewan population, 1979, Projection 13, Saskatchewan Bureau of Statistics.

3. Alberta Bureau of Statistics, Series 4.

TABLE V.2.5

NET REQUIREMENTS, ALBERTA, CERTIFIED PROSTHETISTS/ORTHOTISTS

(Incremental and Cumulative)

YEAR	Low Population Scenario						Medium Population Scenario						High Population Scenario					
	LOW		MEDIUM		HIGH		LOW		MEDIUM		HIGH		LOW		MEDIUM		HIGH	
	C	C	B	B	A	A	C	C	B	B	A	A	C	C	B	B	A	A
1981	-2	-2	1	1	1	1	-2	-2	1	1	1	1	-1	-1	1	1	1	1
1982	3	1	2	3	2	3	3	1	3	4	3	4	2	1	3	4	3	4
1983	0	1	1	4	1	4	1	2	1	5	1	5	1	2	1	5	1	5
1984	2	3	2	6	2	6	2	4	2	7	2	7	2	4	2	7	2	7
1985	0	3	0	6	0	6	0	4	0	7	0	7	0	4	0	7	0	7
1990	2	5	3	9	3	9	3	7	4	11	4	11	4	8	5	12	5	12
1995	-1	4	-1	8	-2	7	0	7	0	11	0	11	0	8	0	12	0	12
2000	0	4	0	8	1	8	1	8	1	12	1	12	2	10	3	15	3	15

Requirements derived using:

A. Historical ratio approach of 1:118,735 achieved in 1980
B. Utilization approach based on estimated current devices (Most likely)
C. Service target ratio approach of 1:140,000

number of prosthetic issues and repairs are shown in Table V.2.4, opposite.

. Service target ratio - Service target requirements were projected using a target ratio of practitioners to population of 1:140,000 as recommended by the Western Canada Post Secondary Education Committee.

d) Net Requirements

Table V.2.5, opposite, shows the net manpower requirement (incremental and cumulative).

. Highlights

Based on the medium population scenario, there is a requirement for additional certified prosthetists and orthetists under each projection approach used. Under the historical ratio approach, there is a requirement for 12 additional practitioners by the year 2000. The same requirement is indicated under the service utilization approach. Under the service target approach there is a requirement for an additional 8 practitioners.

3.2.3 SASKATCHEWAN

a) Legal Controls

The Province of Saskatchewan has no legislative act regulating the professions of prosthetics and orthotics.

b) Insured Services

The Saskatchewan Health, Aids to Independent Living Plan (hereinafter SAIL) covers the cost of prosthetic and orthotic appliances, including fitting, adjustment and repairs for eligible residents. The Plan also provides benefits for prosthetic appliances and special equipment that enable disabled children to remain at home. Wheelchairs are provided on a free-loan basis for as long as required.

c) Assumptions

1 Stock

. Historical stock 1970 to 1980 - Certified and technical prosthetists and orthotists do not operate in independent practice in Saskatchewan. The Wascana Hospital in Regina and the Saskatchewan Council for Crippled Children and Adults (hereinafter SCCCA) are the sole employers

TABLE V.3.1

TOTAL NUMBER OF CERTIFIED PROSTHETISTS

AND ORTHOTISTS IN SASKATCHEWAN, 1970 to 1980

YEAR	CERTIFIED MANPOWER	TECHNICAL MANPOWER	TOTAL
1970	9	4	13
1971	7	4	11
1972	9	3	12
1973	9	5	14
1974	8	4	12
1975	8	9	17
1976	7	11	18
1977	7	10	17
1978	10	12	22
1979	9	14	23
1980	9	11	20

Source: Wascana Hospital. Correspondence with Director of Physical Therapy, September, 1980. Saskatchewan Council for Crippled Children and Adults. Correspondence with Administrator Orthopaedics - Technical Service, October, 1980.

TABLE V.3.2

AGE DISTRIBUTION OF CERTIFIED PROSTHETISTS AND ORTHOTISTS IN SASKATCHEWAN, AS OF OCTOBER 1st, 1980

AGE GROUP	CERTIFIED MANPOWER	TECHNICAL MANPOWER	TOTAL
Less than 20	0	0	0
20 - 29	0	7	7
30 - 39	5	4	9
40 - 49	1	0	1
50 and over	3	0	3
Total	9	11	20

Sources: Wascana Hospital. Correspondence with Director of Physical Therapy, September, 1980. Saskatchewan Council for Crippled Children and Adults. Telephone conversations September and October 1980, with Administrator, Orthopaedics - Technical Services.

Note: 1. All the above manpower are male.

TABLE V.3.3

FACTORS AFFECTING MANPOWER SUPPLY OF CERTIFIED PROSTHETISTS AND ORTHOTISTS, SASKATCHEWAN

FACTOR	ASSUMPTION	SOURCE
Stock	9	Wascana Hospital S.C.C.C.C.A.
Net migration	0	Wascana Hospital S.C.C.C.C.A.
Net immigration	1 every ten years	Wascana Hospital S.C.C.C.C.A.
Net occupational shifts	0	Wascana Hospital S.C.C.C.C.A.
Training output	2	Estimate
Active/ inactive	0	Estimate
Attrition	Retirement at 60 based on 1980 age distribution	Estimate

Note: S.C.C.C.C.A. is the Saskatchewan Council for Crippled Children and Adults

of these professionals in the province. The historical number of certified and technical manpower from 1970 to 1980 is presented in Table V.3.1, opposite.

. Current stock 1980 - The age and sex distribution of the total 1980 stock of prosthetic and orthotic manpower is shown in Table V.3.2, opposite.

ii Factors Affecting Manpower Supply

Table V.3.3, opposite, shows the assumptions made with respect to each of the factors which have the potential to affect stock, that is, migration, immigration, occupational shifts, training output, active to inactive flows, and attrition.

. Net migration - Interprovincial movements of certified prosthetists and orthotists in and out of Saskatchewan have balanced out since 1970, according to SCCCA and Wascana Hospital records. The importance of these movements for manpower utilization, relative to the total stock is substantial, and represents a high level of turnover. For purposes of estimating supply however, a zero rate of net migration is assumed for the forecast period, on the basis of the historical trend.

. Net immigration - In the last ten years, only one certified professional has immigrated to

Saskatchewan according to Wascana Hospital and SCCCA records. This same rate is adopted for the forecast period.

. Net occupational shifts - There is no scope for workers in a related occupation to shift into the prosthetics or orthotics professions without undergoing the five years of required training. According to Wascana Hospital and SCCCA, none of the departures from their staff were attributable to shifts out of the professions. A value of zero is assigned to the occupational shift factor from 1981 to 2000, on the basis of this information. Technicians in prosthetics and orthotics are treated under the section on training output.

. Training output - Both the Wascana Hospital and the SCCCA undertake on-the-job training of prosthetic and orthotic technicians. Over the next three years, five technicians employed by these institutions should be eligible for certification. It is assumed that all these individuals will have the incentive to become certified before 1985, since after that date, all technicians will be required to undergo formal training at the British Columbia Institute of Technology or George Brown College.

Saskatchewan signed a contractual agreement effective September 1980, with the British

Columbia Institute of Technology to purchase up to three places every two years, in the newly introduced training program for prosthetic and orthotic technicians. Only one position was filled in 1981 because of the short notice in which to make the program known to potential candidates. Wascana Hospital and SCCCA administrators anticipate that all three places will be filled in the future. Of the three technicians, it is assumed that two will become certified after completing the relevant clinical practice, however, there is no historical data on which to base this assumption. A number of alternative assumptions are tested in the sensitivity analysis because of this uncertainty.

. Active to inactive flows - The SCCCA and Wascana Hospital administrators were unaware of any inactive or part-time certified prosthetists or orthotists in Saskatchewan. Since there is no provincial association, it was not possible to substantiate this information. However, the small number of manpower in the profession implies frequent contacts and personal knowledge of others in the same profession. A value of zero was assigned to the active/inactive factor on the basis of this information.

. Attrition from death and retirement - Historical retirement data from the two Saskatchewan employers of prosthetists and orthotists indicates an average retirement age of 60. This retirement

TABLE V.3.4

TOTAL PROSTHETIC/ORTHOTIC

ISSUES AND REPAIRS IN SASKATCHEWAN

YEAR	AGE GROUP	0 - 19	20 - 64	65 - 74	75+	TOTAL
1975	Prosthetic	146	464	153	119	882
	Orthotic	1,004	1,153	208	145	2,510
	Total	1,150	1,617	361	264	3,393
1976	Prosthetic	151	513	144	144	953
	Orthotic	1,224	1,762	312	202	3,500
	Total	1,375	2,275	456	346	4,453
1977	Prosthetic	210	544	197	154	1,106
	Orthotic	1,323	1,597	252	267	5,440
	Total	1,533	2,141	449	421	4,546
1978	Prosthetic	105	485	179	149	918
	Orthotic	1,245	2,213	426	319	4,201
	Total	1,350	2,698	605	468	5,119
1979	Prosthetic	104	395	182	124	806
	Orthotic	1,203	1,661	255	185	3,304
	Total	1,307	2,056	437	309	4,110

Source: Saskatchewan Health, Aids To Independent Living. Correspondence September 8, 1980.

Notes: 1. The SAIL information contained unknown ages of patients receiving issues or repairs. This group was distributed by age category according to the known age distribution.

2. The totals may not add up exactly due to rounding needed to distribute those patients mentioned in Note 1, above.

pattern is adopted in order to estimate losses from the current stock through retirement. The small number of practitioners in the two professions precludes any meaningful calculation of mortality.

iii Requirements

. Historical population ratio - The 1980 ratio of one certified prosthetist or orthotist to every 106,213 population is used to derive the number of practitioners required in the future to maintain the current level of service.

. Utilization - The SAIL Plan information on prosthetic and orthotic appliance issues and repairs from 1975 to 1979 is used as a proxy measure of utilization, and is presented in Table V.3.4, opposite. The information is available by age groupings only, and excludes any appliances provided for patients not covered by the Plan. The information causes the model to underestimate actual utilization per capita, and services provided per practitioner. The failure of the data to distinguish the sex of the plan participants served may introduce distortions in the projections.

. Service target ratio - A joint submission by the SCCCA and Saskatchewan Health to the Task Force on Rehabilitation Medicine recommends the introduction of a Mobile Prosthetics/Orthotics

TABLE V.3.5

NET REQUIREMENTS, SASKATCHEWAN, CERTIFIED PROSTHETISTS/ORTHOTISTS

(Incremental and Cumulative)

YEAR	Low Population Scenario						Medium Population Scenario						High Population Scenario					
	LOW		MEDIUM		HIGH		LOW		MEDIUM		HIGH		LOW		MEDIUM		HIGH	
	C	C	A	A	B	B	C	C	A	A	B	B	C	C	A	A	B	B
1981	-2	-2	0	0	0	0	-2	-2	0	0	0	0	-2	-2	0	0	0	0
1982	0	-2	0	0	0	0	0	-2	0	0	0	0	0	-2	1	1	1	1
1983	0	-2	0	0	0	0	0	-2	0	0	1	1	0	-2	0	1	0	1
1984	2	0	2	2	3	3	2	0	3	3	2	3	3	1	2	3	2	3
1985	-2	-2	-1	1	-2	1	-2	-2	-2	1	-2	1	-2	-1	-2	1	-2	1
1990	-4	-6	-5	-4	-5	-4	-4	-6	-5	-4	-5	-4	-4	-5	-4	-3	-4	-3
1995	-10	-16	-10	-14	-10	-14	-10	-16	-9	-13	-9	-13	-10	-15	-9	-12	-9	-12
2000	-5	-21	-5	-19	-4	-18	-4	-20	-4	-17	-4	-17	-4	-19	-4	-16	-4	-16

Requirements derived using:

A. Historical ratio approach of 1:106,213
B. Utilization approach using current devices
C. Service target ratio approach of 1:140,000

Service to service isolated regions in the province. If adopted, the program will necessitate the permanent addition of 1 certified prosthetist/orthotist, and 2 technicians to the current SCCCA staff. Requirements were projected using a service ratio of 1 certified prosthetist/orthotist per 140,000 population, as recommended by the Western Canada Post Secondary Education Committee.

d) Net Requirements

Table V.3.5, opposite, shows the net manpower requirements (incremental and cumulative).

. Highlights

Based on the medium population scenario, there is a surplus of manpower under each of the projection approaches used.

Under the historical ratio approach, there is a surplus of 17 certified prosthetists and orthotists in the year 2000. This same figure is obtained under the utilization approach. Under the service target approach, there is a surplus of 20 practitioners.

TABLE V.4.1

TOTAL NUMBER OF CERTIFIED PROSTHETISTS AND ORTHOTISTS IN MANITOBA, 1973 to 1979

YEAR	MANITOBA ASSOCIATION OF PROSTHETISTS AND ORTHOTISTS[1]
1973	4
1974	5
1975	8
1976	10
1977	9
1978	10
1979	8

Note: 1. Information from the President of the Manitoba Association of Prosthetists and Orthotists

3.2.4 MANITOBA

a) Legal Controls

There is no legislation in Manitoba governing the professions of prosthetics and orthotics.

b) Insured Services

Under the Manitoba Health Services Commission, insured services are provided for prosthetic and orthotic devices when these are prescribed by a medical practitioner. These services include limb prosthetic devices and services; breast prosthesis and surgical brassieres; subject to prior approval of the Commission, limb and spinal orthotic devices and services; artifical eyes; and hearing aids and related services for minors (under 18 years of age) when prescribed by an otologist or audiologist.

c) Assumptions

i Stock

. Historical stock 1973 to 1979 - The historical number of certified orthotists and prosthetists is presented in Table V.4.1, opposite.

TABLE V.4.2

AGE DISTRIBUTION OF CERTIFIED

PROSTHETISTS AND ORTHOTISTS IN MANITOBA, AUGUST, 1980

AGE GROUP	CERTIFIED MANPOWER
Less than 20	-
20 - 29	4
30 - 39	4
40 - 49	1
50 and over	2
Total	11

Note: Information supplied by President
Manitoba Association of Prosthetists
and Orthotists

TABLE V.4.3

FACTORS AFFECTING MANPOWER SUPPLY

CERTIFIED PROSTHETISTS AND ORTHOTISTS, MANITOBA

FACTOR	ASSUMPTION	SOURCE
Stock	11	M.A.P.O.
Net migration	1 every two years	M.A.P.O.
Net immigration	0	M.A.P.O.
Net occupational shifts	0	M.A.P.O.
Training output	1 per year	M.A.P.O.
Active/inactive	0	M.A.P.O.
Attrition	Retirement at 65, based on 1980 age distribution	M.A.P.O.

Notes: M.A.P.O. is the Manitoba Association of Prosthetists and Orthotists

. Current stock - 1980 - The age distribution of the total 1980 stock of orthotists and prosthetists is shown in Table V.4.2, opposite.

ii Factors Affecting Manpower Supply

Table V.4.3, opposite, shows the assumptions made for each of the factors which have the potential to affect stock, that is, migration, immigration, occupational shifts, training outputs, active to inactive flows and attrition.

. Net migration - Based on the historical data from 1970 to 1980, obtained from the President of the Manitoba Association of Prosthetists and Orthotists (MAPO), the net migration figures are 1 certified practitioner every two years.

. Net immigration - The historical data shows that no certified practitioners have immigrated from the province. This factor has therefore been assigned a value of zero for the period under review.

. Net occupational shifts - There is no scope for workers in a related occupation to shift into the profession without undergoing five years of required training. The President of the MAPO indicated that no practitioners left the occupation in the period under review. A value of zero has been assigned to this factor.

. Training output - The Province of Manitoba uses the V-Tech audio-visual training program, and the province has not entered into any formal training agreements with the Government of British Columbia for places at the British Columbia Institute of Technology. Based on historical data obtained from the M.A.P.O., 1 technician per year has upgraded to CBCPO certification on the basis of practical working experience. This figure has therefore been assumed for the period 1981 to 2000.

. Active to inactive flows - The President of the M.A.P.O. was unaware of any inactive or part-time certified orthotists or prosthetists in Manitoba. A value of zero was assigned to this factor in view of this information.

. Attrition from death and retirement - The retirement pattern for the years 1981 to 2000 is based on the age distribution of certified practitioners, supplied by the M.A.P.O.

iii Requirements

. Historical population ratio - The requirements for prosthetists and orthotists were projected using the following historical ratio of practitioners to population of 1:149,540 achieved in 1980 and of 1:126,360, the highest ratio of practitioners to population achieved from 1973 to 1979.

TABLE V.4.4

TOTAL PROSTHETIC AND ORTHOTIC

ISSUES AND REPAIRS IN MANITOBA, 1973 to 1979

	PROSTHETIC			ORTHOTIC			
YEAR	NEW DEVICES	REPAIRS	TOTAL SERVICES	NEW DEVICES	REPAIRS	TOTAL SERVICES	TOTAL SERVICES
1973	-	-	-	-	-	-	4246[1]
1974	-	-	-	-	-	-	4530[1]
1975	592	839	1431	4560	815	5375	6806
1976	904	822	1726	4911	970	5881	7607
1977	1272	912	2184	4331	1195	5526	7710
1978	1227	940	2167	5345	1079	6424	8591
1979	1184	932	2116	5125	1021	6146	8262

Notes: 1. Insured services were introduced May 1971. Data for 1971 and 1972 are not available. In 1973 and 1974 only total number of services is available. Source of data is M.H.S.C.

TABLE V.4.5

NET REQUIREMENTS, MANITOBA, CERTIFIED PROSTHETIST/ORTHOTIST

(Incremental and Cumulative)

YEAR	Low Population Scenario						Medium Population Scenario						High Population Scenario					
	LOW		MEDIUM		HIGH		LOW		MEDIUM		HIGH		LOW		MEDIUM		HIGH	
	A	A	C	C	B	B	A	A	C	C	B	B	A	A	C	C	B	B
1981	-4	-4	-3	-3	-3	-3	-4	-4	-3	-3	-3	-3	-4	-4	-3	-3	-3	-3
1982	1	-3	1	-2	1	-2	1	-3	1	-2	1	-2	1	-3	1	-2	1	-2
1983	1	-2	1	-1	1	-1	1	-2	1	-1	2	0	1	-2	1	-1	2	0
1984	-1	-3	-1	-2	0	-1	-1	-3	-1	-2	-1	-1	-1	-3	-1	-2	-1	-1
1985	0	-3	0	-2	0	-1	0	-3	0	-2	0	-1	0	-3	0	-2	0	-1
1990	-2	-5	-2	-4	-1	-3	-1	-4	-2	-4	-2	-3	-1	-4	-2	-4	-2	-3
1995	1	-4	0	-4	0	-3	0	-4	0	-4	0	-3	0	-4	0	-4	0	-3
2000	-1	-5	-1	-5	-2	-5	-1	-5	-1	-5	-1	-4	-1	-5	0	-4	-1	-4

Requirements derived using:

A. Historical ratio approach of 1:149,540 achieved in 1979
B. Utilization approach based on current devices
C. Service target ratio approach of 1:140,000

. Utilization - The total number of services from 1973 to 1979 was supplied by the Manitoba Health Services Commission. As these figures were for total services, and not age-sex distributed, the historical age-sex distribution for the province of Saskatchewan was applied. These services are shown in Table V.4.4, opposite.

. Service target ratio - Requirements were projected for a service ratio of 1 certified prosthetist/orthotist per 140,000 population, as recommended by the Western Canada Post Secondary Education Committee.

d) Net Requirements

Table V.4.5, opposite, shows the net manpower requirements (incremental and cumulative).

. Highlights

Based on the medium population scenario, there is a surplus of manpower under each of the projection approaches used.

Under the historical ratio approach, there is a surplus of 5 certified prosthetists and orthotists in the year 2000. The same figure is obtained under the utilization approach. Under the service target approach there is a surplus of 4.

4. TRAINING RECOMMENDATIONS

4.1 Introduction

In this section of the report, we review the various alternatives for training locations and funding arrangements for certified prosthetists and orthotists in Western Canada. The alternatives are evaluated using the decision process outlined above. This process follows a series of steps in a logical process, and these are discussed below.

4.2 Step 1 - Analysis of Net Manpower Requirements

Based on the assumption that 70% of the technicians graduating from the British Columbia Institute of Technology (BCIT) will subsequently complete three years practical experience and meet the requirements for certification, we project a limited requirement for additional practitioners until 1985, and a potential surplus after this date.

4.3 Step 2 - Determine Indicated Training Response

The technician program at the B.C.I.T. is in its first year, and there is no history on which to base the assumption that 70% of program entrants will subsequently become certified practitioners. We consider that this is a reasonable assumption, based on the requirement to complete two years of training. Equally, we have no experience to determine the attrition rate during training. As a result of the sensitivity analysis, we have determined that a rate of 50% certification also produces a surplus of practitioners after 1985.

The basic training option in the light of the projected surplus is to cut back on the quota of entrants into the program. We believe that this would be premature, however, in the absence of any historical trends, and we therefore recommend that the stock of certified prosthetists and orthotists is carefully monitored, and the demand for services is also critically assessed. We do not recommend any change in intake at this time, but we suggest that intake should be carefully monitored in the future in relation to established manpower requirements.

APPENDIX A

SCOPE AND CONTROL OF PRACTICE

PROVINCE	CERTIFICATION/LICENSING/REGISTRATION			TRAINING PROGRAM/ACCREDITATION		
	Required Characteristics of Applicants	Certification Requirements	Licensing Requirements	Length of Training & Admission Requirements	Training Location	Educational Accreditation
SASK.		. 5 years practical experience and have completed some short training courses . Have an equivalent combination of training and work experience	. No Saskatchewan certification/licensing body . Pass certification examinations of the Canadian Board of Certification for Prosthetists and Orthotists	. 5 years apprentice-ship and training . Sask. has recently purchased 3 seats at B.C. Insitute of Technology in their newly established 2 year Prosthetics & Orthotics Training Program . Sr. matri-culation with grade 11 physics & grade 12 algebra admission require-ments at B.C.I.T.	. No training schools for prosthetists/ orthotists in Saskatchewan . Students currently training at British Columbia Institute of Technology, Chicago Northwestern University and George Brown College	
MANITOBA	. Fluent in French and/or English	. Graduate from grade 12 selected or combined studies program including English 12, Algebra 12 and Physics 11 . Five years experience in all phases of prosthetics and orthotics . Have taken short term courses from U.C.L.A., Northwestern University and New York University	. No Manitoba certification/ licensing body . Pass certification examinations of the Canadian Board of Certification for Prosthetists and Orthotists	. Training programs available at School of Prosthetics and Orthotics in Quebec and George Brown Community College in Toronto	. No training programs for prosthetists/ orthotists in Manitoba . U.C.L.A. offers a 1 year diploma program which amalgamates all the short term courses . Seattle University and New York University offers a Bachelor of Science degree in Prosthetics/ Orthotics . Institute of Medical Rehabi-litation in Montreal offers a Prosthetists/	

PROVINCE	CERTIFICATION/LICENSING/REGISTRATION			TRAINING PROGRAM/ACCREDITATION		
	Required Characteristics of Applicants	Certification Requirements	Licensing Requirements	Length of Training & Admission Requirements	Training Location	Educational Accreditation
BRITISH COLUMBIA	. Bona fide Canadian resident	. Graduate of a training program approved by the Canadian Board for Certification of Prosthetists and Orthotists	. There is no registration or licensure in British Columbia . Prosthetists/orthotists are certified by the Canadian Board for Certification of Prosthetists and Orthotists . Annual renewal of registration with board	. 2 years . Admission requirements not yet settled, but should be a university entrance in a science program, and a personal interview . Senior matriculation, grade 11 physics, grade 12 algebra	. British Columbia Institute of Technology will offer training program beginning Sept. 1980 . No foreign training programs per se are accredited by the Board	. Any training program approved by the Canadian Board for Certification of Prosthetists and Orthotists
ALBERTA		. 5 year apprenticeship period with an accredited prosthetic/ orthotic facility . Graduates of School of Quebec Diploma Programs in Prosthetics and Orthotics and 2 year internship in an accredited facility . Graduates of George Brown Diploma Program, and two year's internship in an accredited facility	. No certification/ licensing body in Alberta . Individual employing agencies are responsible for regulating the practice of personnel working for them . Pass examination of the Canadian Board for Certification of Prosthetists and Orthotists (C.B.C.P.O.)	. Quebec school: - a 2 year diploma program in Prosthetics - a 2 year diploma in Orthotics - a 3 year combined program in Prosthetics and Orthotics George Brown: - a 2 year diploma for Prosthetic/ Orthotic Technicians - 3 year diploma for Prosthetist /Orthotists	. No training programs for prosthetists/ orthotists in Alberta . Training program available in Canada from The School of Prosthetics and orthotics of Quebec and George Brown Community College in Toronto	. C.B.C.P.O. accredits facilities which provide prosthetic and orthotic services

APPENDIX B

OCCUPATION BIBLIOGRAPHY

BIBLIOGRAPHY ON ORTHOTICS AND PROSTHETICS

American Orthotic and Prosthetic Association. Requirements for Practitioner Certification in Orthotics and Prosthetics.

Canadian Board for Certification of Prosthetists and Orthotists, 1980 Registry.

Department of Physical Medicine and Rehabilitation Calgary General Hospital. Hospital Based Adult Amputee Clinic Programs, and Hospital Based Prosthetic Shops. A Four Year Study, 1972.

Department of Physical Medicine and Rehabilitation Calgary General Hospital. The Clinic Method of Delivering Health Care Services in Prosthetic and Orthotic Work, and Its' Meaning, 1976.

Interprovincial Committee on Prosthetic and Orthotic Operation. Report on A Study to Review the Possibilities of Co-operation in the Prosthetic and Orthotic Industry in the Four Western Provinces, 1976.

Interprovincial Committee on Prosthetic and Orthotic Services. Report on Adhoc Committee on Manpower, 1975.

Interprovincial Committee on Prosthetic and Orthotic Services Report of Adhoc Committee. Methods of Assessing Quality Control and Standards Relating to the Provision of Prosthetic and Orthotic Service.

Interprovincial Committee on Prosthetic and Orthotic Services. Research and Special Projects in Prosthetics and Orthotics Related to the Needs of the Four Western Provinces.

Interprovincial Committee on Prosthetic and Orthotic Services. Report of Adhoc Committee on Manpower 1976.

Minutes on Seminar. Prosthetic and Orthotic Personnel Education, 1977.

Proposal for Training of Prosthetic and Orthotic Technicians in Alberta, 1977.

B.C.I.T., 1976. Proposed Prsthetic and Orthotic Technology Program,

Prosthetics and Orthotics International. Education in Prosthetics and Orthotics, 1978.

Rehabilitation Committee Report to Executive of Alberta Medical Association. Prosthetics and Orthotics in Alberta 1976.

Sweitzer. 1976. Terminology in Prosthetics and Orthotics.

United Nations. Except from the United Nations Inter Regional Services on Standards for the Training of Prosthetists, 1968.

Western Interprovincial Committee on Prosthetic and Orthotic Operations. Education Sub-Committee Report, 1977.

Number/
Numéro

2

Province of
British Columbia

Province of
Alberta

Province of
Saskatchewan

Province of
Manitoba

WESTERN CANADA
HEALTH MANPOWER TRAINING STUDY

SECTION III - CATEGORY 2 REPORTS

- DENTAL LABORATORY TECHNICIANS
- DENTAL MECHANIC
- DENTAL NURSE
- PUBLIC HEALTH INSPECTOR

Report A - THE SCOPE OF EXISTING TRAINING

Report VI - DENTAL LABORATORY TECHNICIANS

Report VI - DENTAL MECHANIC

Province of
itish Columbia

Province of
Alberta

Province of
Saskatchewan

Province of
Manitoba

WESTERN CANADA
HEALTH MANPOWER TRAINING STUDY

Category # 2 - Report A

THE SCOPE OF EXISTING TRAINING PROGRAMS
Category # 2 OCCUPATIONS

Report A - THE SCOPE OF EXISTING TRAINING PROGRAMS - CATEGORY 2 OCCUPATIONS

Report VI - DENTAL LABORATORY TECHNICIANS

Report VII - DENTAL MECHANIC

REPORT 2 - A

The Scope of Existing Training Programs
Category #2 Occupations

THE SCOPE OF EXISTING TRAINING PROGRAMS
CATEGORY #2 OCCUPATIONS

TABLE OF CONTENTS

		Page
1.0	Introduction	1
2.0	Training Programs for Dental Laboratory Technician	2
3.0	Training Programs for Dental Mechanic (Denturist)	4
4.0	Training Programs for Dental Nurse	6
5.0	Training Programs for Public Health Inspectors	8

1.0 INTRODUCTION

In this paper we reviewed the scope of existing training programs in Western Canada for Category #2 Occupations. The paper is divided into the following sections:

- Section 2.0 - Dental Laboratory Technicians
- Section 3.0 - Dental Mechanics (Denturists)
- Section 4.0 - Dental Nurses
- Section 5.0 - Public Health Inspectors

In each section we discuss existing training programs by province, and we review the training programs provided in other provinces of Canada.

2.0 TRAINING PROGRAMS FOR DENTAL LABORATORY TECHNICIANS

2.1 Western Canada

2.1.1 British Columbia

Vancouver Vacational Institute

The Vancouver Vocational Institute offers both a pre-apprentice and apprentice level program for dental laboratory technicians. The pre-apprentice program is offered from July to December of each year, and is common for both dental laboratory technicians and dental mechanics. Following this program, students are eligible to enter the apprenticeship program. This program is offered from January to June, and consists of four modules of instruction. As is the case with the pre-apprentice program, the first two levels of the apprentice program are common for dental laboratory technicians and dental mechanics, and are of four weeks duration. The final two modules, which are also of four weeks duration, provide the dental laboratory technician student with the additional training required to qualify for a certificate.

Currently, enrolment is limited to 15 students in each offering of the pre-apprentice or apprentice programs. A planned major expansion of physical plant facilities could potentially double the program size, possibly by the year 1983. Approximately, 12 to 13 students graduate from the fourth level of the apprenticeship program annually.

2.1.2 Alberta

Northern Alberta Institute of Technology

N.A.I.T. currently offers a two year program for dental laboratory technicians. As is the case with the V.V.I. apprenticeship program, the first year curriculum is common with the dental mechanic program, also offered by N.A.I.T. First year enrolment is limited to 18 students, with admission being determined by the possession of Alberta

grade 12 or equivalent, with course work in mathematics and chemistry. Of the initial student intake, approximately 10 to 12 graduate annually from the second year of the program. These graduates are awarded a certificate, which qualifies them to practice as dental laboratory technicians, subject to additional regulations required by the province of practice.

2.1.3 Saskatchewan

No formal training programs are provided in the province, and the province has no formal training agreement for this occupation.

2.1.4 Manitoba

Winnipeg Technical Vocational High School

The Winnipeg Technical Vocational High School offers a dental technician program as part of the final two years of the high school curriculum. Students spend approximately 50% of their course time in this option, which includes a work experience component.

2.2 Programs in Other Provinces of Canada

For this occupation, there are formal training programs at: George Brown College, Toronto, Ontario.

3.0 TRAINING PROGRAMS FOR DENTAL MECHANICS

3.1 Western Canada

British Columbia

Vancouver Vocational Institute

As mentioned in the previous section dealing with training for dental laboratory technicians, the Vancouver Vocational Institute offers pre-apprentice and apprentice training for dental mechanics. The curriculum for the pre-apprentice program for dental mechanics is common with that for the dental laboratory technician program, as are the first two levels of instruction in the dental mechanic apprentice program. The difference between the dental mechanic and dental laboratory technician apprentice programs is contained in the final two levels of instruction. For the dental mechanic, these two modules are each of six weeks duration, and provide the dental mechanic student with the additional training required to practice as a certified dental mechanic.

Currently, 15 places are available for the dental mechanic students, and the program size would also be affected by the planned expansion of physical plant facilities. The number of students graduating annually from the fourth level of the dental mechanic apprentice program is also approximately 12 to 13 students.

3.1.2 Alberta

Northern Alberta Institute of Technology

The second year of the two year program offered by N.A.I.T., as mentioned in the preceding section dealing with dental laboratory technicians, represents the additional curriculum provided to students to train them as certified dental mechanics. Intake of first year students is set to 18 places annually, and of these, approximately

10 to 12 graduate from the second year of the program. Potential for expansion of this program may be affected by a decision to reallocate certain of the programs currently offered by both N.A.I.T. and S.A.I.T., to a proposed third technical institute for the Province of Alberta.

3.1.3 Saskatchewan

Currently, the Province of Saskatchewan has contracted 3 places in the dental mechanic program offered by N.A.I.T. This agreement was signed commencing with the academic year 1979 - 1980, for an initial period of 5 years. The first graduates from this agreement are expected to return to Saskatchewan this spring, but to date, there is no experience to indicate that this approach will be successful. The Province of Saskatchewan is the only province to enter into a formal arrangement with N.A.I.T. for dental mechanic students, although students from other provinces do attend this institution.

3.1.4 Manitoba

No formal training programs are provided in the province, and the province has no formal training agreement for this occupation.

3.2 Programs in Other Provinces of Canada

For this occupation, there are formal training programs at: George Brown College, Toronto, Ontario, and Dartmouth Regional Vocational School, Dartmouth, Nova Scotia.

EXHIBIT: WASCANA INSTITUTE OF APPLIED ARTS AND SCIENCES

NUMBER OF GRADUATES - 1974 TO 1982

GRADUATES/YEAR	1974	1975	1976A	1977B	1978C	1979D	1980	1981	1982
MALE	1	0	1	1	3	3	1		
FEMALE	34	54	62	65	73	69	28		
TOTAL	35	54	63	66	76	72	29	21	22

Notes: 1976 figures include training in Dental Nursing provided to:

- 4 Denal Hygienist from Quebec
- 5 Registered Dental Hygienists from Manitoba
- 2 Registered Dental Hygienists from Saskatchewan

B,C,D, 1977, 1978 & 1979 figures include number of Manitoba students trained at Wascana Institute under a special opportunity bursary from the Manitoba Department of Continuing Education and Manpower. This program terminated with the graduates in 1979, and there are currently no plans to re-institute it.

Number of Manitoba graduates per year:

1976 - 5 Dental Hygienists trained as Dental Nurses
1977 - 14 Dental Nurses
1978 - 27 Dental Nurses
1979 - 33 Dental Nurses
Total: 79

4.0 TRAINING PROGRAMS FOR DENTAL NURSES

4.1 Western Canada

4.1.1 British Columbia

No formal training programs are provided in the province, and the province has no formal training agreements for this occupation.

4.1.2 Alberta

No formal training programs are provided in the province, and the province has no formal training agreement for this occupation.

4.1.3 Saskatchewan

Wascana Institute of Applied Arts & Sciences - Regina, Saskatchewan

The two year course in dental nursing was established at Wascana Institute in 1972. The basic program objective is to develop skills and knowledge in students to enable them to provide preventive and restorative dental services for pre-school and school-age children. The admission requirements are for grade 12 education with two sciences (physics, chemistry or biology), at a grade 12 level or adult admission. Exhibit opposite shows the numbers graduating from the program from 1974 until projected 1982 output. The annual enrolment quota is established based on the anticipated demand for dental nurses. The projected enrolment quota for 1981 is 30 with an anticipated graduating output of 22 students.

There are currently no formalized training contracts between the 3 other Western Provinces and the Government of Saskatchewan for places

in the dental nursing program at Wascana Institute. In 1974, 1975, 1976 and 1977, the Manitoba Department of Continuing Education and Manpower granted special opportunity bursaries for students to attend Wascana Institute. However, this financial assistance was terminated on the graduation of the 1977 students (in 1979), and there are presently no plans to re-institute the bursary program.

4.1.4. Manitoba

No formal training programs are provided in the province, and the province has no formal training agreement for this occupation.

4.2 Programs in Other Province of Canada

The program at Wascana Institute represents the only training program in dental nursing in Canada.

5.0 TRAINING PROGRAMS FOR PUBLIC HEALTH INSPECTORS

5.1 WESTERN CANADA

5.1.1 British Columbia

British Columbia Institute of Technology

The two year program offered by the British Columbia Institute of Technology represents the only training program currently offered in Western Canada for Public Health Inspectors. The cross disciplinary nature of the curriculum is designed to give students a thorough understanding of the many health hazards in the environment, and to equip them to measure, evaluate, and recommend control of these hazards. The basic admission requirements stipulate graduation from high school, with course work in chemistry and mathematics. The nature of the work excludes those individuals who are severely handicapped, colourblind, and unable to detect odors.

The annual enrolment quota of first year students was reduced from 60 places to 40 places in the fall of 1979, as a result of the unavailability of employment opportunities for the graduates. Of the 40 students entering the first year, it is anticipated that 25 to 30 will graduate. If demand for the graduates were to increase, it would be feasible to increase the number of training places available to 60, although the current intake of 40 students per year represents a desired level.

University of Victoria

In discussions with members of the Executive of the various provincial chapters of the Canadian Institute of Public Health Inspectors, it was indicated that preliminary discussions have taken place with the

University of Victoria concerning the possibility of a degree program in environmental health. Initial discussions would seem to indicate a four year program with a minimum enrolment with 20 students per year, and a start date of approximately 1983 - 1984. It must be emphasized, however, that these discussions are preliminary and there has been no formal committment by either the University of Victoria or the Government of British Columbia to establish such a program.

5.1.2 Alberta

No formal training programs are currently provided in the province, and the province has no formal training agreement for this occupation. Bursary assistance is provided to 3 - 5 students annually to attend the B.C.I.T. program.

As is the case with the University of Victoria, Athabasca University is also involved in a preliminary discussion of a degree program in environmental health, to be offered through that institution. Preliminary indications are that the program, if offered, would be intended for those individuals who are currently certified as public health inspectors, and wish to upgrade or expand their qualifications. To date, however, there has been no formal discussion of such a program by the Academic Planning Committee of Athabasca University, nor has a letter of intent been forwarded to the Government of Alberta.

5.1.3 Saskatchewan

No formal training programs are provided in the province, and the province has no formal training agreement for this occupation. Bursary assistance is provided, however, to students in public health inspection programs. It is intended to provide three bursaries per year in the immediate future.

5.1.4 Manitoba

No formal training programs are provided in the province, and the province has no formal training agreement for this occupation.

5.2 Programs in Other Provinces of Canada

For this occupation, there are formal training programs at: Ryerson Polytechnical Institute, Toronto, Ontario, and Ste. Hyacienthe, Quebec.

Discussion of these follows.

Ryerson Polytechnical Institution, Toronto, Ontario

Ryerson introduced the first formal training program for public health inspectors in Canada in 1962. Initially of one year duration, the program was changed to two years in length in 1967. Of the 90 students who entered the program in 1979, 61 are expected to graduate this spring. In the fall of 1980, 57 students entered the program, but todate, it is unknown how many will graduate in 1982.

In the fall of 1980, Ryerson introduced a four year degree program, a Bachelor's of Applied Arts, with an initial enrolment of 16 to 17 students. The intent of this degree program is to provide moderate exposure to the field of environmental health, with increased emphasis on the public administration aspects of environmental health function. To date, the potential impact of this program on the availability of health manpower is uncertain.

Ste-Hyacinthe, Quebec

The program at Ste-Hyacinthe, is a two year certificate program

similar to that offered at B.C.I.T. and Ryerson PolyTechnical Institute. It is a small program by comparison, with an annual intake of approximately 10 students per year. Dropout does not seem to be a problem, as evidenced by the projection of 10 graduates in 1982 and 10 graduates in 1983. It is a French language speaking institution, and primarily serves the needs of the Province of Quebec.

College of Cape Breton, Sydney, Nova Scotia

The College of Cape Breton is currently developing a degree program in environmental health. This program is primarily being designed to service the Maritime Provinces and Newfoundland. The curriculum for this program is currently under development, and it is estimated that the first year will see a class of approximately 12 to 15 students.

Additionally, it is projected that approximately 5 to 6 certified public health inspectors would enroll on a part-time basis to the degree program. After the intitial year, it is expected that the enrolment would be approximately 25 to 30 students annually.

Province of British Columbia

Province of Alberta

Province of Saskatchewan

Province of Manitoba

WESTERN CANADA
HEALTH MANPOWER TRAINING STUDY

Category # 2 - Report VI

DENTAL LABORATORY TECHNICIAN

REPORT VI

DENTAL LABORATORY TECHNICIAN:

THE REQUIREMENT FOR ALTERNATIVE TRAINING AND FUNDING ARRANGEMENTS IN WESTERN CANADA

REPORT VI
DENTAL LABORATORY TECHNICIAN
THE REQUIREMENT FOR ALTERNATIVE TRAINING
AND FUNDING ARRANGEMENTS IN WESTERN CANADA

TABLE OF CONTENTS

PAGE

PREFACE

Study Background - General Introduction 1
Study Origins 1
Study Objectives 2
Study Timing 2
Occupation Definition 3

1. TRAINING NEEDS IN WESTERN CANADA

Introduction 4
Existing Training Programs 5
Occupational Issues 6

2. TRAINING RESPONSES

Decision Process 8
Timing and Location of Manpower Requirements 8
Indicated Training Responses 8
Defined Alternative Training Locations 9
Review of Funding Arrangements 10

PAGE

3. RECOMMENDATIONS 11

APPENDIX I - Study Approach and Methodology
APPENDIX II - Provincial Net Manpower Requirement
APPENDIX III - Scope of Practice
APPENDIX IV - Bibliography

PREFACE

Study Background - General Introduction

The provision of effective health services to the community is, to a considerable degree, dependent on three essential resources:

- an adequate supply of well trained specialist staff in each health occupation group
- the development of adequate facilities to service the community
- the availability of adequate funds to ensure cost effective and efficient health services.

The range and complexity of health treatment programs has expanded greatly in Canada during the last twenty-five years. In addition, changing technology and the development of new treatment programs have resulted in an increased requirement for skilled, adequately trained health manpower. These factors have resulted in an increased emphasis on manpower planning and skill training for health occupations to ensure an adequate supply of trained practitioners to meet defined manpower requirements.

Study Origins

The Western Canada Health Manpower Training Study was initiated by the Western Premiers at their annual conference in 1980. The study is under the direction of a Steering Committee comprised of government representatives from the Provinces of British Columbia, Alberta, Saskatchewan and Manitoba. The members of the Steering Committee represent both the Health and Education departments within each provincial government.

Study Objectives

The study terms of reference contain two major objectives. These are:

- to assess the existing and future needs for health manpower training programs and facilities in Western Canada

- to make recommendations for the rationalization of the location and funding of health manpower training programs and facilities in Western Canada.

Study Timing

The study consists of a review of 26 health occupations to be examined in five categories. The second category consists of four occupations, selected for the study on the basis of current availability of training programs in Western Canada. Although the study is divided into five categories for review, each occupation within these is to be studied independently over the next two years. Several of the occupations are inter-related. The requirement for one kind of manpower may be influenced by that of another, yet the two occupations may not be reviewed at the same time. Therefore, the study recommendations should be reviewed once all the occupations have been studied.

Occupation Definition

A dental mechanic may be generally defined as an individual who:

"designs, constructs, fits and repairs dentures. Measures patient's jaws to determine size and shape of dentures using face bows, dental articulators and other devices. Makes impressions and molds of teeth, gums and jaws and design dentures. Directs other workers to construct dentures. Fits, adjusts and repairs dentures. Constructs dentures, if required."[1]

Typically, each province has additional requirements or specifications governing the work of the dental mechanic. Detailed discussion of these additional qualifications and conditions are contained in the subsequent sections pertaining to each province.

The practice of dental mechanic work in Western Canada is under the direct regulatory control of provincial legislation. In all of the Western Canadian provinces, with the exception of British Columbia, separate licensing boards are responsible for maintaining standards of practice. In British Columbia, however, both the dental mechanic and the dental laboratory technician come under the aegis of a common board, called the Dental Technicians Board. This has been a point of contention for the dental mechanics in that province, who are actively lobbying for separate legislation and board mechanisms.

The dental mechanic tends to operate in solo or small group practices, typically of a storefront nature. The charges for the services provided by dental mechanics are comparably lower than dentists, although dentists perceive services to be of lower quality.

1. Canadian Classification and Dictionary of Occupations, No. 3157, 1971.

EXHIBIT 1

MANPOWER REQUIREMENTS

WESTERN CANADA, DENTAL MECHANICS (DENTURISTS)

(BASED ON MOST LIKELY SCENARIO FROM EACH PROVINCE)

YEAR	PROJECTED STOCK	PROJECTED REQUIREMENT
1981	410	419
	NET	9
1982	423	439
	NET	9
1983	437	443
	NET	6
1984	449	453
	NET	4
1985	459	468
	NET	9
1990	513	538
	NET	25
1995	552	591
	NET	39
2000	605	636
	NET	31

1.0 TRAINING NEEDS IN WESTERN CANADA

1.1 Introduction

Exhibit 1, opposite, shows the projected stock and requirement for dental mechanics during the period 1981 - 2000. These projections are based on the most likely scenario derived for each province, and show the minimal requirement for an additional 31 practitioners on a regional basis.

The most likely scenario for each province has been based on estimates obtained from the Alberta Health Care Insurance Commission, Extended Benefits Plan which provides coverage for inhabitants of that province who are over 65 years of age. Projections using these estimates were based on two assumptions: firstly, that the ratio of complete dentures provided to the over-65 age group to the total number of dentures provided would remain constant; secondly, that the future utilization pattern of complete dentures would remain the same. This latter assumption may not, in fact, be borne out over the next two decades. Indications received during meetings and telephone conversations with various government and association representatives are that there is an anticipated decline in the demand for complete dentures. The impact of this potential decline, while not quantifiable at this point, would result in an oversupply of practitioners in Western Canada. It is conceivable that permitting dental mechanics across Western Canada to provide partial denture services would offset the anticipated decline in demand for complete denture services.

In the absence of stable utilization data for the other three western provinces, these Alberta estimates were used and superimposed upon the over-65 age group in each province, and subjected to the same assumptions outlined above. From the perspective of assessing the training implications of the projected manpower requirement, it was considered that these estimates, while not definitive, would provide a reasonable basis for decisions on future training needs.

In the absence of stable utilization data for the other three western provinces, these Alberta estimates were used and superimposed upon the over-65 age group in each province and subjected to the same assumptions outlined above. From the perspective of assessing the training implications of the projected manpower requirement, it was considered that these estimates, while not definitive, would provide a reasonable basis for decisions on future training needs. It is conceivable that this approach could potentially underestimate the projected net manpower requirements. Given the size of the indicated surplus in western Canada in the forecast period, however, this bias would not affect the training recommendations for dental laboratory technicians.

There are no quantifiable estimates of the future impact of technology available at this time. The various professional groups and government agencies contacted, however, indicated that the surplus illustrated in the exhibit might be even larger in the future. This would be due to a potential declining demand for prosthetic services. The impact of this trend would be to further amplify the surplus in Western Canada.

1.2 Existing Training Programs

There are currently three programs in western Canada which provide training for dental laboratory technicians. The Vancouver Community College, Vancouver Vocational Institute offers both pre-apprentice and apprentice level programs, and the Northern Alberta Institute of Technology offers a two year certificate program. An option in the final two years of the curriculum of the Winnipeg Technical Vocational High School also provides training for dental technicians. For a more detailed discussion of these training programs, please refer to Report 2 - A, "The Scope of Existing Training Programs Category II Occupations."

1.3 Occupational Issues

The provinces of British Columbia and Alberta each have a formal examining body which tests both the practical and theoretical knowledge of those persons wishing to be designated as a registered dental technician. By way of contrast, Saskatchewan has legislation, but the legislation is not apparently enforced, and Manitoba has a definition and enabling legislation which has never been implemented. In these latter two provinces, it appears that the majority of practising dental laboratory technicians are trained on the bench, with little formal training provided. Meetings with various government and professional representatives in Manitoba indicated that this is an area of concern with respect to the quality of services provided by these practitioners. In the province of Saskatchewan, it has been indicated that a significant volume of advanced prosthetic work is being completed in laboratories outside the provincial boundaries. The consensus is that removable prosthetic appliances are adequately fabricated. This indicates that some type of formal upgrading program is appropriate in both the provinces of Saskatchewan and Manitoba.

In all four provinces, the services of the dental laboratory technician overlap with those of the dental mechanic in the provision of complete dentures. In the province of Saskatchewan, this overlapping of functions also extends to the provision of partial dentures. Unlike the dental mechanic, who is permitted to deal directly with the public, the dental laboratory technician must work under the prescription of a dentist. There is no direct competition between the dental laboratory technician and the dental mechanic, but rather between the dentist and the latter. To a somewhat limited extent, the functions of the dental laboratory technician may also be provided by the dentist. Dependent on factors such as the busyness of the dental practice, or the individual level of expertise, the dentist may also fabricate and fit oral prosthetic devices. It has

been suggested that this trend might be continued in the future, due to a potential oversupply of dentists and the economic implications of the utilization of dental auxiliaries in such a situation.

Still another major occupational issue is the potential impact of the continuing trend in preventive dentistry on the services provided by dental technicians. The trend toward preventive dental care in the past two to three decades may result in higher levels of oral health which could potentially lead to a lower demand for certain types of prostheses in the future. Specifically, the number of newly edentulous people in the population may decline dramatically over the next two decades resulting in a lessened demand for complete dentures.

Parallel with the trend away from removable prostheses, there will be a potential increase in the demand for fixed appliances, particularly with the proliferation of third party insurance programs. This further emphasizes the need for enhanced levels of competency in the fabrication of complex fixed appliances.

EXHIBIT 2

NET MANPOWER REQUIREMENTS

MOST LIKELY SCENARIO

OCCUPATION: DENTAL LABORATORY TECHNICIANS

YEAR	BRITISH COLUMBIA		ALBERTA		SASKATCHEWAN		MANITOBA		REGION	
	STOCK	REQUIREMENT	STOCK	REQUIREMENT	STOCK	REQUIREMENT	STOCK	REQUIREMENT	STOCK	REQUIREMEN
1981	296	291	135	148	42	42	-	-	473	481
NET		-5		13		0	-	-		8
1982	309	299	142	153	43	43	-	-	494	495
NET		-10		11		0	-	-		1
1983	322	306	150	157	45	44	-	-	517	507
NET		-16		7		-1	-	-		-10
1984	335	314	158	162	47	45	-	-	540	521
NET		-21		4		-2	-	-		-19
1985	348	324	166	168	48	46	-	-	562	538
NET		-24		2		-2	-	-		-24
1990	408	374	201	197	54	51	-	-	663	622
NET		-34		-4		-3	-	-		-41
1995	468	412	241	225	62	54	-	-	771	691
NET		-56		-16		-8	-	-		-80
2000	523	443	275	250	69	56	-	-	867	749
NET		-80		-25		-13	-	-		-118

Note: Manitoba: No provincial association. No formal registration board for dental technicians

Most Likely Scenario:

- Utilization approach based on trends in Alberta over 65 age group
- Medium population scenario

2.0 TRAINING RESPONSES

2.1 Decision Process

The decision process, outlined in Appendix I, and discussed in detail in Report C, "A Decision Process To Evaluate the Location of, and Funding Arrangements For Health Occupation Training Programs In Western Canada," was used to evaluate training implications of the net manpower requirements for dental laboratory technicians discussed in Section 1.1, above. This section contains the results of this analysis.

2.2 Timing and Location of Manpower Requirement

Exhibit 2, opposite, shows the projected manpower requirement for the period 1981 - 2000 for each of the provinces under the most likely scenario. As the exhibit indicates, there is a surplus at the regional level throughout the next two decades, with the exception of Alberta which has a requirement until the year 1985. As mentioned in Section 1.3, above, the major issue is not the number of practitioners required, but rather the level of expertise of current practitioners, especially in the provinces of Saskatchewan and Manitoba. The priority for training, therefore, should focus on upgrading facilities, not an expansion of introductory level training programs.

2.3 Indicated Manpower Responses

The preceeding discussion indicates the need for two different types of training responses, introductory and upgrading skill training. Each of these is discussed in more detail below.

- Introductory training - the apprentice level program at the Vancouver Community College, Vancouver Vocational Institute is presently producing more graduates than the British Columbia market can potentially absorb. The proposed expansion of this program to approximately double its present size does not seem justified, and the program should be held at its present level. A similar response is indicated for the two year certificate program at the Northern Alberta Institute of Technology. The minimal requirement in Alberta for the time period until 1985 does not require an expansion of this program, and no increase in student intake is justified.

- Upgrading programs - the concerns expressed in the provinces of Saskatchewan and Manitoba dealing with the quality of services provided by members of this occupational group indicate the need for skill upgrading programs. A series of modules dealing with each of the major services provided by the dental laboratory technician should be developed for presentation at institutions in these two provinces. The expertise required to develop these modules could be obtained from the faculty who are currently involved in formal training programs for this occupation.

2.4 Defined Alternative Locations

The required numbers of practitioners with entry level skills is more than adequately addressed at this point by the programs at Vancouver Community College, Vancouver Vocational Institute and Northern Alberta Institute of Technology. There is no justification for either expanding these programs or establishing additional programs.

With respect to upgrading facilities, the location is of necessity at the provincial level. This is due to the need to be close to

the majority of the practitioners who will take advantage of these training programs. In Manitoba, approximately 90% of active dental technicians practice in the City of Winnipeg. As such, the program at the Winnipeg Technical Vocational High School has the physical plant facilities necessary to offer this type of program. Faculty support could be provided by either the current staff at this institution, or if this is not sufficient, by contracting training personnel from other technician training programs.

In Saskatchewan, a similar pattern of urban concentration exists and preliminary indications are that the Wascana Institute of Applied Arts and Sciences would be in a position to serve as a site for delivery of these skill upgrading modules. Dependent on the type of physical plant facilities required, Kelsey Institute of Applied Arts and Sciences might also be a potential location for this training.

2.5 Review of Funding Arrangements

Although the location of the upgrading training programs is provincial, it is anticipated that the modules to be developed would be common. As such, the provinces of Saskatchewan and Manitoba should share on an equal basis the program development costs associated with each module. After the development of the curriculum, however, the ongoing operational and administrative costs, as well as the initial capital costs specific to each province should be borne by that province. Additionally, to provide an incentive to practitioners to undertake skill upgrading programs, the respective Governments of Saskatchewan and Manitoba should provide some form of financial aid to these people.

3.0 RECOMMENDATIONS

1. That an effective method be developed by the employers and professional associations to control the numbers admitted into apprenticeships for dental laboratory technicians in British Columbia.

2. That there be no increase in the number of student enrolments in the two year certificate program at the Northern Alberta Institute of Technology.

3. That the provinces of Saskatchewan and Manitoba, where feasible, jointly develop skill upgrading modules.

4. That these skill upgrading modules be presented at Wascana Institute of Applied Arts & Sciences and at Kelsey Institute of Applied Arts & Sciences in Saskatchewan, and at Red River Community College in Manitoba.

5. That the program development costs be shared on an equal basis by the provinces of Saskatchewan and Manitoba, conditional on the ability to jointly develop modules.

6. That the ongoing operational and administrative costs and initial capital costs specific to a province be borne by that province (i.e. Saskatchewan or Manitoba).

7. That the respective Governments of Saskatchewan and Manitoba provide financial aid to those practitioners undertaking skill upgrading programs.

APPENDIX I

STUDY APPROACH AND METHODOLOGY

STUDY APPROACH

Introduction

In order to achieve the study objectives, the work program consists of three key activities. These are:

- the analysis of manpower supply and requirements, and the calculation of net manpower requirements
- the analysis of existing training programs for Western Canada
- the development of recommendations for alternative training locations and funding arrangements

Analysis of Manpower Supply and Requirements

The analysis of manpower supply and requirements is designed to allow for a variety of data inputs, and for different emphasis depending on the occupation under review. A variety of data sources are used including provincial and national associations, health insurance agencies, and provincial health and education departments. In all instances, data is developed independently of previously published sources.

In addition to the basic projection of net manpower requirements, a number of sensitivity analyses have been completed to assess the impact of changed in the factors affecting supply and requirements, prior to developing recommendations for either additional training programs, or expanding existing training programs.

Approaches to Determining Manpower Requirements

The approach developed to determine manpower requirements uses three methods of projection. These are discussed below.

1. Service Utilization Approach

The utilization approach is based on an analysis of the pattern of health service usage. It establishes trends in service utilization and projects these onto future population estimates. There are three steps in the service utilization approach.

Step 1 - Determine Per Capita Utilization Rate

Historical data of the number of services provided, by age and sex of recipient is derived. The number of services per age/sex group is then divided by the population for group in the corresponding year. This results in a per capita utilization rate.

Step 2 - Project Future Service Required

The per capita utilization rate is projected onto the low, medium and high population for each year from 1981 to 2000. This results in an estimate of total future services.

Step 3 - Estimated Number of Practitioners Required

Having determined the total future services, the model projects the number of practitioners required, by assuming a constant level of services per practitioner. The number of services per practitioner is determined by dividing total services by the number of practitioners in the base year. To estimate the required number of practitioners, the model divides total future services required by the number of services per practitioner.

2. Service Target Ratio Approach

Service target ratios reflect a theorectical optimal manpower level required to meet health service requirements in the occupation under review. They are expressed as the ratio of practitioner to population. The service target ratios are derived based on discussion with health authorities, review of published reports, articles and summary of defined health care needs.

3. Population Ratio Approach

Population ratios are derived by dividing the total population at a specific point in time by the number of active practitioners. This results in a ratio of practitioners to population.

These ratios are analysed to determine if any trends exists. to project futuren manpower requirements, the model divides total projected population by the previously determined population ratio.

Summary of Approaches to Projecting Manpower Requirements

The three approaches outlined above have been used for the calculation of manpower requirements for this occupation. The specific application of each approach to this occupation is discussed under General Assumption, Appendix II, following.

Development of Recommendations for Alternative Training Locations and Funding Arrangements

We have developed a decision process to assist in developing recommendations for alternative training location(s) and funding arrangements. This process is designed to allow for the logical, consistent evaluation of a range of training alternatives.

There are seven steps in the decision process:

- Step 1. Analysis of manpower requirements
- Step 2. Identification of the appropriate type(s) of training
- Step 3. Definition of alternative training locations
- Step 4. Evaluation of alternative locations for new programs
- Step 5. Establishment of timing of training program requirement
- Step 6. Recommendation on training action(s) and location(s)
- Step 7. Recommendation on funding alternative(s)

APPENDIX II

PROVINCIAL NET MANPOWER REQUIREMENTS

TABLE VI.0.1

TOTAL NUMBER OF DENTAL LABORATORY TECHNICIANS

IN WESTERN CANADA

YEAR	BRITISH COLUMBIA[1]	ALBERTA[2]	SASKATCHEWAN[3]	MANITOBA[4]
1970	-	-	35	Not available
1971	-	-	31	Not available
1972	-	-	29	Not available
1973	-	-	30	Not available
1974	-	-	37	Not available
1975	-	-	33	Not available
1976	-	-	32	Not available
1977	246	128	33	Not available
1978	-	136	37	Not available
1979	289	143	43	Not available
1980	283	128	43	Not available

Notes:
1. 1977 and 1979 from Roll Call 79, 1980 from Report R:10
2. Health and Social Services Manpower in Alberta 1979
3. Association of Dental Technicians of Saskatchewan
4. No data available for Manitoba

TABLE VI.0.2

FACTORS AFFECTING MANPOWER SUPPLY

DENTAL LABORATORY TECHNICIANS, WESTERN CANADA

FACTOR	BRITISH COLUMBIA	ALBERTA	SASKATCHEWAN	MANITOBA
Opening Stock	283	128	41	Not available
Net Migration	2 per year	0	1 per year	Not available
Net Immigration	2 per year	0	0	Not available
Net Occupational Shifts	-1 per year	0	0	Not available
Training Output	12 per year	9/year	1 per year	Not available
Active/Inactive Flows	0	0	0	Not available
Attrition	Age distribution estimate from Report R:10 retirement at 65	Age distribution based on B.C. data retirement at 65	1981 Age distribution retirement at 65	

TABLE VI.0.3

AGE STRUCTURE OF DENTAL LABORATORY TECHNICIANS

BY PROVINCE AND REGION

AGE GROUP	BRITISH COLUMBIA	ALBERTA	SASKATCHEWAN	MANITOBA
24 or less	86	39	3	Not available
25 - 29			6	Not available
30 - 34	99	45	10	Not available
35 - 39			3	Not available
40 - 44	49	22	4	Not available
45 - 49			4	Not available
50 - 54	34	15	2	Not available
55 - 59			3	Not available
60 - 64	15	7	3	Not available
65 & over	-	-	1	Not available
Unknown	-	-	2	Not available
Total	283	128	41	Not available

GENERAL ASSUMPTIONS

Manpower Stock

Table VI.0.1, opposite, contains the total number of dental laboratory technicians registered in Western Canada. It contains those practitioners who are active in their respective provinces as identified by the sources noted at the bottom of the table.

Factors Affecting Manpower Supply

The assumptions made with respect to each of the factors which have the potential to affect manpower stock are shown opposite in Table VI.0.2. These factors include migration, immigration, occupational shifts, training output, active/inactive movements, and attrition. For each assumption, the information source has been identified. Table VI.0.3, opposite, shows the age distribution of practitioners in Western Canada.

Estimating Requirements

- Historical Ratio

  For each province, the current ratio of dental laboratory technicians to population was used to project the number of dental laboratory technicians required in the future to maintain the current level of manpower.

- Utilization

  Given the current unavailability of stable utilization data from the recently introduced Dental Plan, statistics obtained from the Alberta Health Care Insurance Commission, Extended Benefits Plan of the total number of insured services provided by dentists

(and indirectly, dental laboratory technicians) were used as the basis for utilization projections. This plan provides coverage for the over-65 age group, which represents the largest consumer group for prosthetic appliances. The per capita utilization rate for Alberta was applied to the over-65 age distribution in all provinces. It was further assumed that the ratio of services performed for the dentist by the dental laboratory technician to the total number of services provided by the dentist under the Alberta plan would remain constant during the forecast period.

- Service Target Ratio

For this occupational group, no service target information was available, hence no projections were made using this approach.

Sensitivity Analysis

Because of the unavailability of utilization information from the provinces, no sensitivity analysis was undertaken.

PROVINCIAL ASSUMPTIONS

BRITISH COLUMBIA

a) Legal Controls

As is mentioned in the report dealing with Dental Mechanics, The Dental Technicians Act (R.S. Chapter 91, 1979) appoints a board, known as the Dental Technicians Board, which administers both the Dental Mechanics and the Dental Laboratory Technicians in the province. The act outlines the services which the dental laboratory technician may provide and the regulations under which this practitioner may perform these services.

The certification and licensing requirements are shown in Appendix 2 - Scope and Control of Practice.

b) Insured Services

The recently introduced Dental Care Plan of British Columbia covers 50% of dental costs up to a maximum of $700 per annum to a number of special interest groups in the province. For all of these groups, full upper and lower, or partial dentures are included in the coverage.

Full dentures may be provided by either the dental mechanic or the dental laboratory technician (working under the prescription of the dentist). Partial dentures may be provided by the dental laboratory technician (under the prescription of the dentist).

TABLE VI.1.1

NUMBER OF LICENSED DENTAL LABORATORY TECHNICIANS

IN BRITISH COLUMBIA, 1977 TO 1980

YEAR	ROLL CALL 79
1977	246
1978	-
1979	289
1980	283

TABLE VI.1.2

TOTAL NUMBER OF ACTIVE DENTAL

LABORATORY TECHNICIANS BY AGE, BRITISH COLUMBIA

AGE GROUP	MALE	FEMALE	TOTAL
21 - 30	66	20	86
31 - 40	87	12	99
41 - 50	43	6	49
51 - 60	31	3	34
60 and over	14	1	15
Total	241	42	283

Source: Health Manpower Research Unit, Report R:10

Note: The percentage of practitioners who responded to the survey group was applied to the total number of registered technicians to estimate the age-sex distribution of the practitioner population.

TABLE VI.1.3

FACTORS AFFECTING MANPOWER SUPPLY

DENTAL LABORATORY TECHNICIANS, BRITISH COLUMBIA

FACTOR	ASSUMPTION	SOURCE
Opening Stock	283	H.M.R.U. Report R.10
Net Migration	2 per year	D.T.B.B.C.[1]
Net Immigration	2 per year	D.T.B.B.C.
Net Occupational Shifts	1 leaving each year	D.T.B.B.C.
Training Output	12 per year	D.T.B.B.C.
Active/Inactive	0 per year	D.T.B.B.C.
Attrition	Age distribution estimated from Report R.10, assuming retirement at age 65	

Note: 1. Dental Technicians Board of British Columbia

c) Assumptions

. Manpower Stock

Table VI.1.1, opposite, contains the total number of dental laboratory technicians registered in British Columbia. The age distribution of active registered practitioners (Table VI.1.2) is based on the reported ages of those dental laboratory technicians who responded to the survey, discussed in Report R:10, published by the Health Manpower Research Unit.

. Factors Affecting Manpower Supply

The assumptions made with respect to each of the factors which have the potential to affect manpower stock are shown opposite in Table VI.1.3. These factors include migration, immigration, occupational shifts, training output, active/inactive movements, and attrition. For each assumption, the information source has been identified.

. Estimating Requirements

. Historical Ratio

The current ratio of dental laboratory technicians to population, 1:9,270, was used to project the number of dental laboratory technicians required in the future to maintain the current level of manpower.

. Utilization

As indicated in the General Assumptions section, above, Alberta estimates were used for projection purposes.

TABLE VI.1.4 MANPOWER REQUIREMENTS

PROVINCE: BRITISH COLUMBIA

OCCUPATION: DENTAL LABORATORY TECHNICIANS

	PROJECTED MANPOWER REQUIREMENTS					
YEAR	PROJECTED STOCK	POPULATION APPROACH 1:9270			UTILIZATION-BASED* ON ALBERTA FIGURES		
		LOW	MEDIUM	HIGH	LOW	MEDIUM*	HIGH
1981	296	286	288	291	291	291	292
	NET	-10	-8	-5	-5	-5	-4
1982	309	291	294	297	299	299	300
	NET	-18	-15	-12	-10	-10	-9
1983	322	295	300	304	305	306	307
	NET	-27	-22	-18	-17	-16	-15
1984	335	-300	-306	311	313	314	315
	NET	-35	-29	-24	-22	-21	-20
1985	348	305	312	318	323	324	325
	NET	-43	-36	-30	-25	-24	-23
1990	408	327	342	351	371	374	377
	NET	-81	-66	-57	-37	-34	-31
1995	468	347	368	383	407	412	417
	NET	-121	-100	-85	-61	-56	-51
2000	523	364	392	411	435	443	448
	NET	-159	-131	-112	-88	-80	-75

Note: The asterisked column (*) represents the most likely scenario for this occupation in British Columbia.

Net Manpower Requirements

Table VI.1.4, opposite, shows the projected manpower requirements under each projection approach. The most likely scenario is based on the per capita service utilization approach, estimated from the Alberta experience, under the medium population projection. This analysis indicates a consistent surplus of practitioners throughout the forecast period. This surplus may be further emphasized by the potential reduction in the service demand for prosthetic devices.

TABLE VI.2.1

NUMBER OF ACTIVE DENTAL TECHNICIANS

IN ALBERTA, 1977 TO 1980

YEAR	
1977	128[1]
1978	136[1]
1979	143[1]
1980	128[2]

Notes: 1. Alberta Dental Technicians Board, statistics as reported in "Health and Social Services Manpower in Alberta, 1979."

2. The 1980 figure was obtained from the records of the Alberta Dental Technicians Board, and excludes those practitioners with an out-of-province address and those with dual certification as dental mechanics. This latter group (16 individuals) is purported to be practising as dental mechanics, not as dental technicians.

TABLE VI.2.2

TOTAL NUMBER OF ACTIVE

DENTAL TECHNICIANS IN ALBERTA, BY AGE,

AGE GROUP	MALE	FEMALE	TOTAL
21 - 30	-	-	39
31 - 40	-	-	45
41 - 50	-	-	22
51 - 60	-	-	15
60 and over	-	-	7
Total	-	-	128[1]

Source: B.C. Dental Laboratory Technician age distribution composed of total number of dental technicians registered with the Alberta Dental Technicians Board.

Notes: 1. This total excludes those practitioners registered with the Board with out-of-province address, and those with dual certification as dental mechanics.

ALBERTA

a) Legal Controls

The Dental Technicians Act (R.S.A. 1970, c. 93) establishes a board, named the Dental Technicians Board, which controls training and education requirements, registration procedures, establishes regulations, and grants the designation "registered dental technicians." The certification and licensing requirements are shown in Appendix 2 - Scope and Control of Practice.

b) Insured Services

The Extended Health Benefits Plan of the Alberta Health Care Insurance Plan provides dental goods and services for registrants aged 65 or over, and their spouses and dependents. To the extent that dentists provide dental prosthetic services to this group, the dental laboratory technician is engaged in the fabrication and provision of these devices.

c) Assumptions

- Manpower Stock

  Table VI.2.1, opposite, contains the total number of dental technicians registered in Alberta. This count excludes those practitioners with business addresses external to Alberta, and additionally, those practitioners with dual designation as certified dental mechanics. In the absence of adequate data on the age distribution of Alberta practitioners, the distribution for British Columbia was assumed to be proportionately similar. This age distribution is shown in Table VI.2.2, opposite.

TABLE VI.2.3

FACTORS AFFECTING MANPOWER SUPPLY

DENTAL TECHNICIANS, ALBERTA

FACTOR	ASSUMPTION	SOURCE
Opening Stock	128	A.D.T.B.[1]
Net Migration	0	A.S.C.D.T.[2]
Net Immigration	0	A.S.C.D.T.[2]
Net Occupational Shifts	0	A.S.C.D.T.[2]
Training Output	9	N.A.I.T.[3]
Active/Inactive	0	A.S.C.D.T.[2]
Attrition	Age structure for B.C. Dental Laboratory Technicans was imposed on the opening stock for Alberta, with retirement assumed at age 65	Report R:10, Health Manpower Research Unit, University of British Columbia

Notes: 1. Alberta Dental Technicians Board
2. Alberta Society for Certified Dental Technicians
3. Northern Alberta Institute of Technology

TABLE VI.2.4 MANPOWER REQUIREMENTS

PROVINCE: ALBERTA

OCCUPATION: DENTAL TECHNICIANS

PROJECTED MANPOWER REQUIREMENTS							
YEAR	PROJECTED STOCK	POPULATION APPROACH 1:16270			UTILIZATION*		
		LOW	MEDIUM	HIGH	LOW	MEDIUM*	HIGH
1981	135	131	133	134	147	148	148
	NET	-4	-2	-1	12	13	13
1982	142	135	138	139	152	153	153
	NET	-7	-4	-3	10	11	11
1983	150	138	143	143	156	157	157
	NET	-12	-7	-7	6	7	7
1984	158	141	148	148	160	162	162
	NET	-17	-10	-10	2	4	4
1985	166	144	153	153	166	168	168
	NET	-22	-13	-13	0	2	2
1990	201	158	174	180	193	197	198
	NET	-43	-27	-21	-8	-4	-3
1995	241	171	195	207	218	225	227
	NET	-70	-46	-34	-23	-16	-14
2000	275	183	215	234	241	250	254
	NET	-92	-60	-41	-34	-25	-21

Note: The asterisked column (*) represents the most likely scenario for this occupation in Alberta.

- Factors Affecting Manpower Supply

The assumptions made with respect to each of the factors which have the potential to affect manpower stock are shown in Table VI.2.3, opposite. These factors include migration, immigration, occupational shifts, training output, active/inactive movements, and attrition. For each assumption, the information source has been identified.

- Estimating Requirements

  - Historical Ratio

    The current ratio of dental technicians to population, 1:16,270, was used to project the number of dental technicians required in the future to maintain the current level of manpower.

  - Utilization

    As discussed in the General Assumptions section, above, Alberta estimates were used for projection purposes.

  - Net Manpower Requirements

    Table VI.2.4, opposite, shows the projected manpower requirements under each projection approach. The most likely scenario is based on the per capita service utilization approach, under the medium population projection. This analysis shows a decreasing requirement for manpower during the forecast period, with a surplus projected after 1985.

TABLE VI.3.1

NUMBER OF DENTAL TECHNICIANS

IN SASKATCHEWAN, 1970 TO 1980

YEAR	SASKATCHEWAN HEALTH MANPOWER ANNUAL REPORT (1978)	ASSOCIATION OF DENTAL TECHNICIANS, PROVINCE OF SASKATCHEWAN[1]
1970	-	35
1971	-	31
1972	-	29
1973	-	30
1974	-	37
1975	-	33
1976	32	32
1977	33	33
1978	36	37
1979	N/A	43
1980	N/A	43

Note: 1. Based on data from the Association of Dental Technicians, Province of Saskatchewan

TABLE VI.3.2

TOTAL NUMBER OF ACTIVE DENTAL

TECHNICIANS IN SASKATCHEWAN BY AGE, 1981

AGE GROUP	MALE	FEMALE	TOTAL
20 - 24	3	-	3
25 - 29	5	1	6
30 - 34	9	1	10
35 - 39	3	-	3
40 - 44	4	-	4
45 - 49	4	-	4
50 - 54	2	-	2
55 - 59	3	-	3
60 - 64	3	-	3
65 and over	1	-	1
Unknown	1	1	2
Total	38	3	41

Source: Association of Dental Technicians of Saskatchewan

SASKATCHEWAN

a) Legal Controls

The Dental Technicians Act (Chapter D-6, R.S.S. 1978) is the act regulating the practice of dental technicians in the Province of Saskatchewan. The definition of the occupation contained in the act is consistent with the definition in Section 2.1, above.

The certification and licensing requirements are shown in Appendix 2 - Scope and Control of Practice.

b) Insured Services

The Medical Services Division administers the payments for certain non-insured health services to persons receiving assistance under programs administered by Saskatchewan Social Services, including Assistance Plan beneficiaries, government wards, and inmates of correctional institutions.

Under this plan, certain dental services including preventive, restorative, exodontic, orthodontic and prosthetic dentistry are insured.

c) Assumptions

- Manpower Stock

  Table VI.3.1, opposite, contains the total number of dental technicians registered in Saskatchewan. It contains only those practitioners who are active. The age distribution of practitioners is shown in Table VI.3.2, opposite.

TABLE VI.3.3

FACTORS AFFECTING MANPOWER SUPPLY

DENTAL TECHNICIANS, SASKATCHEWAN

FACTOR	ASSUMPTION	SOURCE
Opening Stock	41	A.D.T.S.
Net Migration	1	A.D.T.S.
Net Immigration	0	A.D.T.S.
Net Occupational Shifts	0	A.D.T.S.
Training Output	1 per year 1981-2000	A.D.T.S.
Active/Inactive Attrition	0 1981 Age Distribution retirement at 65	A.D.T.S. A.D.T.S.

Note: A.D.T.S. is Association of Dental Technicians of Saskatchewan

TABLE VI.3.4 MANPOWER REQUIREMENTS
PROVINCE: SASKATCHEWAN
OCCUPATION: DENTAL TECHNICIANS

		PROJECTED MANPOWER REQUIREMENTS					
YEAR	PROJECTED STOCK	POPULATION APPROACH 1:23530			UTILIZATION BASED* ON ALBERTA DATA		
		LOW	MEDIUM	HIGH	LOW	MEDIUM*	HIGH
1981	42	41	42	43	42	42	42
	NET	-1	0	1	0	0	0
1982	43	42	42	44	43	43	43
	NET	-1	-1	1	0	0	0
1983	45	42	43	44	44	44	44
	NET	-3	-2	-1	-1	-1	-1
1984	47	43	43	45	45	45	45
	NET	-4	-4	-2	-2	-2	-2
1985	48	43	44	46	46	46	46
	NET	-5	-4	-2	-2	-2	-2
1990	54	45	47	51	50	51	51
	NET	-9	-7	-3	-4	-3	-3
1995	62	46	50	56	54	54	55
	NET	-16	-12	-6	-8	-8	-7
2000	69	47	52	60	55	56	57
	NET	-22	-17	-9	-14	-13	-12

Note: The asterisked column (*) represents the most likely scenario for this occupation in Saskatchewan.

- Factors Affecting Manpower Supply

The assumptions made with respect to each of the factors which have the potential to affect manpower stock are shown in Table VI.3.3, opposite. These factors include migration, immigration, occupational shifts, training output, active/inactive movements, and attrition. For each assumption, the information source has been identified.

- Estimating Requirements

  - Historical Ratio

The current ratio of dental laboratory technicians to population, 1:23,530, was used to project the number of dental laboratory technicians required in the future to maintain the current level of manpower.

  - Utilization

As discussed in the General Assumptions section, above, Alberta estimates were used for projection purposes.

  - Net Manpower Requirements

Table VI.3.4, opposite, shows the net manpower requirements under each projection approach. The most likely scenario is based on the utilization approach derived from the Alberta experience, under the medium population projection. There is a minimal surplus of practitioners during the forecast period. While the potential impact of a decline in the usage of prosthetic devices has not been analysed, the effect of this trend would be to further emphasize this potential surplus.

MANITOBA

a) Legal Controls

The Dental Health Worker's Act (S.M. 1975, C 35-CAP. D31) and Manitoba Regulation 122/76 provide a definition and enabling legislation for dental technicians. The intent of this legislation is to provide the capability for the Government of Manitoba to employ dental technicians in dental plans. To date, however, this section of the act and regulation has not been implemented.

b) Insured Services

Currently, the Health Services Commission provides for payment for certain dental services, including prosthetic devices for welfare receipients, and individuals with cleft palates.

c) Assumptions

- Manpower Stock

There is currently no formal registration board for dental technicians in Manitoba. In addition, there is no provincial association, or corporate body representative of the practitioners in the province.

Various estimates of manpower have been obtained, including the reported figures in the Health Manpower Provincial Report 1979, which indicate an estimated 94 dental technicians practicing in Winnipeg in 1978. This figure is considered to be inflated, in that is contains several different levels of competence. Other estimates indicate that there are only 8 - 10 qualified dental

technicians in the province, all of whom will retire in the projection period (within the next ten years). There are approximately 50 bench-trained technicians with expertise in only a limited range of prosthetic skills. The balance of reported technicians are composed of basic unskilled helpers who are subject to a high turnover rate.

The impact of the limited data for this occupation was that the normal manpower requirement forecasting approach could not be used. Efforts were made to obtain information from several sources, but this proved to be of limited use in preparing the projected manpower needs. In the absence of any definitive service target ratios, the existing population ratios for British Columbia, Alberta and Saskatchewan were projected onto the population in Manitoba to determine approximate manpower requirements. Based on this projection, there is an indicated requirement for between 45 and 65 qualified dental technicians in the year 1981 and between 50 and 70 in the year 2000. Based on these assumptions, there is an immediate requirement for trained practitioners.

The underlying issue for this occupation is the quality and skill level of the existing dental technicians in relation to that required to provide an effective range of services. The consensus from professional and government contacts was that there is a significant need to upgrade the skills of the existing practitioners. Thus, in summary, the major training issue is not the number of practitioners required, but rather the range of skill upgrading programs to develop an adequate manpower base.

APPENDIX III - SCOPE OF PRACTICE

DENTAL LABORATORY TECHNICIANS: CONTROL OF PRACTICE

PROVINCE	CERTIFICATION/LICENSING/REGISTRATION			TRAINING PROGRAM/ACCREDIATION		
	REQUIRED CHARACTERISTICS OF APPLICANTS	CERTIFICATION REQUIREMENTS	LICENSING REQUIREMENTS	LENGTH OF TRAINING & ADMISSION REQUIREMENTS	TRAINING LOCATION	EDUCATIONAL ACCREDITATION
British Columbia Dental Technicians Act, 1958, C.13, S.1 Page 1973-2	1. Good character		1. Pass prescribed examination by Dental Technicians Board.	1. 4 four week modules constitute the school based component of the 4 year apprenticeship program. 2. Two year full-time program. 3. Alberta Grade 12 or equivalent	1. Vancouver Community College, Vancouver Vocational Institute. 2. Graduates from 2 year Certificate Program at N.A.I.T., enter third year apprenticeship.	
Alberta R.S.A. 1970 Chapter 93	1. 21 years of age 2. Good moral character 3. Free from disability	1. Pass examination set by Board appointed under Dental Technician Act. 2. 5 years of practical experience, of which 1 year must be in Alberta. OR 3. 2 year certificate plus 3 years of practical experience.		1. two year certificate program.	1. N.A.I.T.	
Saskatchewan R.S.S. 1978 Chapter D-6	1. 21 years of age 2. Good moral character 3. Proof of at least 4 years of service with a dental technician in Saskatchewan.		1. Proof of having successfully obtained pass standing at the examination conducted by the University of Saskatchewan.	1. No specified length of training.	1. No training programs located in Saskatchewan.	
Manitoba No enacted enabling legislation.						

APPENDIX IV - BIBLIOGRAPHY

BIBLIOGRAPHY ON DENTAL LABORATORY TECHNICIANS

D.H.E.W. "A Report to the President and Congress on the Status of Health Professions Personnel in the United States" United States Department of Health, Education, and Welfare.

"Policy Paper on Continuing Education Programs for Health Personnel in Alberta." Alberta Health and Social Services Disciplines Committee, February, 1980.

"Semi-Annual Survey of the Major Employers of Health and Social Service Personnel" Alberta Health and Social Services Disciplines Committee.

"Roll Call'79: A Status Report of Health Personnel in the Province of British Columbia", Report R-12.

Saskatchewan Health, Saskatchewan Health Manpower Annual Report, 1978.

"Health and Social Service Manpower In Alberta 1979", Alberta Health and Social Services Disciplines Committee.

"Health Manpower Provincial Report - Manitoba 1979" Research Section, Manitoba Department of Health.

"A Report on Allied Health Personnel" United States Department of Health, Education and Welfare. D.H.E.W. Publication 1979: No. (HRA) 80 - 28.

"Dental Technicians in British Columbia, 1979: A Survey of Licentiates of Dental Technicians' Board of British Columbia, 1979" Report R:10 Division of Health Services Research and Development, Health Sciences Centre, University of British Columbia.

Health Manpower in Ontario - 1980. Strategic Research and Manpower Planning Branch, Ontario Ministry of Health, October, 1980.

"Status Report on Dentists and Dental Auxiliaries" Alberta Health and Social Services Disciplines Committee, February, 1979.

Lewis, M., Unpublished Report of Dental Health Care Needs of the Adult Population in the Province of Saskatchewan. Saskatchewan Health.

Rosenstein, D.I., et al, "Professional Encroachment: A Comparison of the Emergence of Denturists in Canada and Oregon" American Journal of Public Health, June, 1980.

Waldman, H.B., "Will Dentistry Eventually Make Use of Expanded Duties and Denturism" Dental Survey, November, 1976.

Province of
British Columbia

Province of
Alberta

Province of
Saskatchewan

Province of
Manitoba

WESTERN CANADA
HEALTH MANPOWER TRAINING STUDY

Category # 2 - Report VII

DENTAL MECHANIC

Report VIII - DENTAL NURSE
Report IX - PUBLIC HEALTH INSPECTOR
Report VII - DENTAL MECHANIC

REPORT VII

DENTAL MECHANIC:

THE REQUIREMENT FOR ALTERNATIVE TRAINING AND FUNDING ARRANGEMENTS IN WESTERN CANADA

REPORT VII

DENTAL MECHANIC

THE REQUIREMENT FOR ALTERNATIVE TRAINING

AND FUNDING ARRANGEMENTS IN WESTERN CANADA

TABLE OF CONTENTS

PAGE

PREFACE

Study Background - General Introduction 1
Study Origins 1
Study Objectives 2
Study Timing 2
Occupation Definition 3

1. TRAINING NEEDS IN WESTERN CANADA

Introduction 4
Existing Training Programs 5
Occupational Issues 5

2. TRAINING RESPONSES

Decision Process 7
Timing and Location of Manpower Requirements 7
Indicated Training Responses 7
Defined Alternative Training Locations 8
Review of Funding Arrangements 8
Defined Length of Training Agreement 9

PAGE

3. TRAINING RECOMMENDATIONS 10

APPENDIX I - Study Approach and Methodology
APPENDIX II - Provincial Net Manpower Requirement
APPENDIX III - Scope of Practice
APPENDIX IV - Bibliography

PREFACE

Study Background - General Introduction

The provision of effective health services to the community is, to a considerable degree, dependent on three essential resources:

- an adequate supply of well trained specialist staff in each health occupation group
- the development of adequate facilities to service the community
- the availability of adequate funds to ensure cost effective and efficient health services.

The range and complexity of health treatment programs has expanded greatly in Canada during the last twenty-five years. In addition, changing technology and the development of new treatment programs have resulted in an increased requirement for skilled, adequately trained health manpower. These factors have resulted in an increased emphasis on manpower planning and skill training for health occupations to ensure an adequate supply of trained practitioners to meet defined manpower requirements.

Study Origins

The Western Canada Health Manpower Training Study was initiated by the Western Premiers at their annual conference in 1980. The study is under the direction of a Steering Committee comprised of government representatives from the Provinces of British Columbia, Alberta, Saskatchewan and Manitoba. The members of the Steering Committee represent both the Health and Education departments within each provincial government.

Study Objectives

The study terms of reference contain two major objectives. These are:

- to assess the existing and future needs for health manpower training programs and facilities in Western Canada

- to make recommendations for the rationalization of the location and funding of health manpower training programs and facilities in Western Canada.

Study Timing

The study consists of a review of 26 health occupations to be examined in five categories. The second category consists of four occupations, selected for the study on the basis of current availability of training programs in Western Canada. Although the study is divided into five categories for review, each occupation within these is to be studied independently over the next two years. Several of the occupations are inter-related. The requirement for one kind of manpower may be influenced by that of another, yet the two occupations may not be reviewed at the same time. Therefore, the study recommendations should be reviewed once all the occupations have been studied.

Occupation Definition

A dental laboratory technician is defined as an individual who:

> "makes and repairs dentures and other dental devices. Fabricates full and partial dentures, using wax and plaster models, dental surveyors, articulators (fitting devices) and electric grinders and polishers. Shapes metal, vulcanite or plastic plates for dentures. Mounts porcelain or plastic teeth in plates using knowledge of size, shape, shade, and colour. Finishes dentures on grinding and buffing wheels. Constructs metal clasps, inlays, bridgework, and other aides according to specifications. brakes, makes additions or relines denture bases to repair dentures." [1]

The practice of dental laboratory technician work in Canada is under the direct regularatory control of provincial legislation, with the exception of the Province of Manitoba. The various provincial licensing boards are responsible for maintaining standards of practice. The practitioner typically works in a laboratory, either as an owner-operator, or as a technician in the employment of a laboratory, and the work is performed according to the prescription of a dentist. Alternatively, a technician may work directly for a dentist, typically as part of a group practice, and provides prosthetic support to the dentists in that practice.

1. Canadian Classification and Dictionary of Occupation, 1971.NO. 3157.

EXHIBIT 1

MANPOWER REQUIREMENTS

WESTERN CANADA, DENTAL LABORATORY TECHNICIANS

(BASED ON MOST LIKELY SCENARIO FROM EACH PROVINCE)

YEAR	PROJECTED STOCK	PROJECTED REQUIREMENT
1981	473	481
	NET	8
1982	494	495
	NET	1
1983	517	507
	NET	-10
1984	540	521
	NET	-19
1985	562	538
	NET	-24
1990	663	622
	NET	-41
1995	771	-691
	NET	-80
2000	867	749
	NET	-118

1.0 TRAINING NEEDS IN WESTERN CANADA

1.1 Introduction

Exhibit 1, opposite, shows the projected stock and requirement for dental laboratory technicians during the period 1981 - 2000. These projections are based on the most likely scenario derived for each province, and show an average annual surplus of 6 practitioners throughout this time period. The exhibit excludes the province of Manitoba, due to a number of factors specific to that province. Currently, there is neither active legislation nor a professional association for this occupation in Manitoba. The major issue does not appear to be the number of practitioners, either presently or in the future, but rather the quality of work provided by these practitioners. Because of this, Manitoba has been excluded from a projection of numbers required in the future.

For each province, the most likely scenario has been based on two factors: the medium population projection for that province; utilization information obtained from the Alberta Health Care Insurance Commission, Extended Benefits Plan. Dental care services, including those provided by the dental laboratory technician, are provided to citizens of the province of Alberta who are over 65 years of age. The estimates of total services provided under this plan which were used were based on two assumptions: firstly, that the ratio of services provided by dental technicians to the total number of insured dental services would remain constant; that the future utilization of services in the over-65 age group would remain proportionate to those used by the population as a whole.

1.2 Existing Training Programs

The Northern Alberta Institute of Technology offers the only certificate level training for this occupation in Western Canada, of two years duration. The province of Saskatchewan has entered into a training agreement with the province of Alberta, and provides bursaries to three students annually to attend the dental mechanic program at N.A.I.T. In British Columbia, the Vancouver Community College, Vancouver Vocational Institute offers both pre-apprentice and apprentice level training for dental mechanics. For a more detailed discussion, please refer to Report 2 - A, "The Scope of Existing Training Programs Category II Occupations."

1.3 Occupational Issues

One of the major issues facing the dental mechanic occupation is the overlapping of services with both the dental laboratory technician and the dentist. There are essentially two major distinctions between the work of the dental mechanic and that of the dental laboratory technician in the provision of complete denture services. Firstly, the dental mechanic is permitted to work in the mouth of the patient, with respect to the taking of impressions and the fitting of the device. Secondly, the dental mechanic is permitted to deal directly with the public, and in this respect, may be seen as being in direct competition with the dentist in the provision of complete denture services, whereas the dental laboratory technician typically works in support of the dentist. Additionally, in the province of Saskatchewan, the dental mechanic and dentist also compete for the partial denture market. Historically, the dental profession has opposed the provision of services by the dental mechanic, on the grounds that the dental mechanic is not qualified to work in the mouth of a patient. Recent trends in the United States and Canada, however, would seem to indicate that the dental mechanic is being accepted by the public and various levels of government as a legitimate provider of dental care.

The advent of preventive dentistry practices over the past two to three decades may result in an overall lowered demand for oral protheses. It is anticipated that the number of newly endentulous patients in the population will decline most significantly during the next two decades. Unlike the dental laboratory technician, who provides a broader range of services, the dental mechanic may be more susceptible to changes in demand for prosthetic appliances. This is due to the very narrow range of services provided by the dental mechanic. Whereas the dental laboratory technician is sufficiently diversified in the oral prosthetic market, the dental mechanic may experience difficulty in maintaining a vaiable business operation unless he becomes more diversified.

It has been indicated that the Northern Alberta Institute of Technology is currently investigating the possibility of developing the necessary curriculum to provide dental mechanic students with expertise in the area of partial denture work. The impact of this on the current legislated role in all provinces except Saskatchewan, where the dental mechanic, subject to additional certification requirements, is legally entitled to perform these partial denture services, is unknown at this time.

EXHIBIT 2

NET MANPOWER REQUIREMENTS

MOST LIKELY SCENARIO

OCCUPATION: DENTAL MECHANICS

YEAR	BRITISH COLUMBIA		ALBERTA		SASKATCHEWAN		MANITOBA		REGION	
	STOCK	REQUIREMENT	STOCK	REQUIREMENT	STOCK	REQUIREMENT	STOCK	REQUIREMENT	STOCK	REQUIREMENT
1981	169	172	135	138	56	56	50	53	410	419
NET		3		3		0		3		9
1982	173	177	142	143	59	58	49	54	423	439
NET		4		1		-1		5		16
1983	178	181	148	148	62	59	49	55	437	443
NET		3		0		-3		6		6
1984	184	185	152	152	65	60	48	56	449	453
NET		1		0		-5		8		4
1985	191	191	155	158	65	62	48	57	459	469
NET		0		3		-3		9		9
1990	211	221	182	186	75	68	45	63	513	538
NET		10		4		-7		18		25
1995	222	243	203	211	87	72	40	65	552	591
NET		21		8		-15		25		39
2000	244	261	230	234	97	75	34	66	605	636
NET		17		4		-22		32		31

Note: Most Likely Scenario

- Utilization approach, based on trends in Alberta over 65 age group.
- Medium population scenario

2.0 TRAINING RESPONSES

2.1 Decision Process

The decision process outlined in Appendix I and discussed in detail in Report C, "A Decision Process To Evaluate the Location of, and Funding Arrangements For Health Occupation Training Programs in Western Canada", was used to evaluate the training implications of the net manpower requirements for dental mechanics discussed in Section 1.1, above. This section contains the results of this analysis.

2.2 Timing and Location of Manpower Requirement

Exhibit 2, opposite, shows the projected manpower requirement for the period 1981 - 2000 for each of the provinces, under the most likely scenario. As the exhibit indicates, there is a minimal requirement at the regional level throughout the next two decades with the exception of Saskatchewan, which has a surplus during this period. The surplus in Saskatchewan is based on the assumption of three contracted places in the dental mechanic program at N.A.I.T.

2.3 Indicated Training Responses

British Columbia has a minimal requirement for approximately 1 additional practitioner each year over the forecast period. The apprentice level program at the Vancouver Community College, Vancouver Vocational Institute can meet this requirement without an increase in student intake. Similarly, Alberta's manpower requirement can be met by maintaining the current level of output from the Northern Alberta Institute of Technology certificate program. Saskatchewan, however, which has a slight surplus of dental mechanic practitioners, should consider reducing the number of contracted places at N.A.I.T.

This would bring the manpower situation in that province more into balance. In the province of Manitoba, the large proportion of older practitioners will lead to a requirement for additional practitioners during the next twenty years. Presently, Manitoba has no formal training agreement with the Northern Alberta Institute of Technology to obtain dental mechanic manpower. This province should consider entering a training agreement similar to that currently in effect between the provinces of Saskatchewan and Alberta, in an effort to meet its' anticipated manpower requirement.

2.4 Defined Alternative Location

The apprentice level program at the Vancouver Community College, Vancouver Vocational Institute is capable of meeting the identified manpower requirements for the province of British Columbia during the next two decades. There is no need to either expand or otherwise alter the student enrolment in this program. With respect to the other three western provinces, the two year certificate program at N.A.I.T. has the capability of addressing the additional manpower requirements for these provinces. As outlined in the preceding section, the level of student intake should be adjusted to reflect the additional requirements for the province of Manitoba and the lessened demand in the province of Saskatchewan.

2.5 Review of Funding Arrangements

Based on the assumption that the two year certificate program at N.A.I.T. assume the status of the site for dental mechanic training for the provinces of Alberta, Saskatchewan, and Manitoba, the two latter provinces should enter into formal bilateral training agreements with the province of Alberta. Specifically, the province of Manitoba should contract for two training places annually, and the

province of Saskatchewan reduce the number of contracted training places at N.A.I.T. by 1 place (from 3 to 2) at the conclusion of the existing training agreement. Both the provinces of Saskatchewan and Manitoba should share in the ongoing operational and administrative overhead costs of the program based on the proportion of training places for which each contracts. Program development, start-up and capital costs would be excluded from these training agreements on the basis that the program is already in existence.

2.6 Defined Length of Training Agreement

The manpower requirement in the province of Manitoba is immediate, and this province should initiate a training agreement immediately. The initial training agreement should terminate simultaneously with the existing training contract between Alberta and Saskatchewan. Upon expiry of these two training agreements, both the provinces of Saskatchewan and Manitoba should enter new bilateral training agreements with the province of Alberta for an initial period of five years with renewal options for subsequent five year periods.

3.0 RECOMMENDATIONS

- That an effective method be developed by the employers and professional associations to control the numbers admitted into apprenticeships for dental mechanics in British Columbia.

- That the current enrolment level for the province of Alberta at N.A.I.T. not be increased.

- That the province of Saskatchewan reduce the number of contracted training places in N.A.I.T. by 1 place (from 3 to 2) at the conclusion of the existing training agreement.

- That Manitoba enter into an interim training contract with the Government of Alberta for two training places, annually in the dental mechanic program at N.A.I.T. and that this agreement terminate simultaneously with the existing training contract between Alberta and Saskatchewan.

- That the terms of the interim training contract between the provinces of Alberta and Manitoba be similar to those in the existing training contract between Alberta and Saskatchewan.

- That at the time of re-negotiation of the training agreement between Saskatchewan and Alberta, a new basis for cost sharing based on the proportion of training places be introduced.

- That under the new bilateral training agreement between Alberta and the provinces of Saskatchewan and Manitoba, program costs be shared on the following basis: Alberta 66%, Saskatchewan 17%, and Manitoba 17%.

APPENDIX I

STUDY APPROACH AND METHODOLOGY

STUDY APPROACH

Introduction

In order to achieve the study objectives, the work program consists of three key activities. These are:

- the analysis of manpower supply and requirements, and the calculation of net manpower requirements
- the analysis of existing training programs for Western Canada
- the development of recommendations for alternative training locations and funding arrangements

Analysis of Manpower Supply and Requirements

The analysis of manpower supply and requirements is designed to allow for a variety of data inputs, and for different emphasis depending on the occupation under review. A variety of data sources are used including provincial and national associations, health insurance agencies, and provincial health and education departments. In all instances, data is developed independently of previously published sources.

In addition to the basic projection of net manpower requirements, a number of sensitivity analyses have been completed to assess the impact of changed in the factors affecting supply and requirements, prior to developing recommendations for either additional training programs, or expanding existing training programs.

Approaches to Determining Manpower Requirements

The approach developed to determine manpower requirements uses three methods of projection. These are discussed below.

1. Service Utilization Approach

The utilization approach is based on an analysis of the pattern of health service usage. It establishes trends in service utilization and projects these onto future population estimates. There are three steps in the service utilization approach.

Step 1 - Determine Per Capita Utilization Rate

Historical data of the number of services provided, by age and sex of recipient is derived. The number of services per age/sex group is then divided by the population for group in the corresponding year. This results in a per capita utilization rate.

Step 2 - Project Future Service Required

The per capita utilization rate is projected onto the low, medium and high population for each year from 1981 to 2000. This results in an estimate of total future services.

Step 3 - Estimated Number of Practitioners Required

Having determined the total future services, the model projects the number of practitioners required, by assuming a constant level of services per practitioner. The number of services per practitioner is determined by dividing total services by the number of practitioners in the base year. To estimate the required number of practitioners, the model divides total future services required by the number of services per practitioner.

2. Service Target Ratio Approach

Service target ratios reflect a theorectical optimal manpower level required to meet health service requirements in the occupation under review. They are expressed as the ratio of practitioner to population. The service target ratios are derived based on discussion with health authorities, review of published reports, articles and summary of defined health care needs.

3. Population Ratio Approach

Population ratios are derived by dividing the total population at a specific point in time by the number of active practitioners. This results in a ratio of practitioners to population.

These ratios are analysed to determine if any trends exists. To project futuren manpower requirements, the model divides total projected population by the previously determined population ratio.

Summary of Approaches to Projecting Manpower Requirements

The three approaches outlined above have been used for the calculation of manpower requirements for this occupation. The specific application of each approach to this occupation is discussed under General Assumption, Appendix II, following.

Development of Recommendations for Alternative Training Locations and Funding Arrangements

We have developed a decision process to assist in developing recommendations for alternative training location(s) and funding arrangements. This process is designed to allow for the logical, consistent evaluation of a range of training alternatives.

There are seven steps in the decision process:

- Step 1. Analysis of manpower requirements
- Step 2. Identification of the appropriate type(s) of training
- Step 3. Definition of alternative training locations
- Step 4. Evaluation of alternative locations for new programs
- Step 5. Establishment of timing of training program requirement
- Step 6. Recommendation on training action(s) and location(s)
- Step 7. Recommendation on funding alternative(s)

APPENDIX II

PROVINCIAL NET MANPOWER REQUIREMENTS

TABLE VII 0.1

TOTAL NUMBER OF DENTAL MECHANICS, IN WESTERN CANADA

YEAR	BRITISH COLUMBIA[1]	ALBERTA[2]	SASKATCHEWAN[3]	MANITOBA[4]
1970	115	-	-	-
1971	-	-	-	-
1972	-	-	-	-
1973	-	-	-	54
1974	-	-	-	51
1975	-	-	-	56
1976	-	-	-	54
1977	137	122	-	54
1978	140	123	53	55
1979	147	127	54	54
1980	175	136	55	52

Notes:
1. Denturist Society of B.C., 1970, 1978 Roll Call 1977, 1979; Dental Technicians Board, 1980
2. Health and Social Services Manpower in Alberta, 1979 Alberta Board of Examiners for Certified Dental Mechanics for 1980
3. Saskatchewan Health Manpower Annual Report for 1978 Denturists Society of Saskatchewan 1979 and 1980
4. Health Manpower Provincial Report Manitoba 1973 - 1979 Manitoba Dental Mechanics Board - 1980

TABLE VII 0.2

FACTORS AFFECTING MANPOWER SUPPLY

DENTAL MECHANICS, WESTERN CANADA

FACTOR	BRITISH COLUMBIA	ALBERTA	SASKATCHEWAN	MANITOBA
Opening Stock	175	136	55	52
Net Migration	1 every 2nd year	1 every 2nd year	0	0
Net Immigration	0	0	0	0
Net Occupational Shifts	0	0	0	0
Training Output	6-8 1981-1983 8-10 1984-1985 8 per year 1985-2000	8/year	2-1981, 3 per year -2000	1 every 2nd year
Active/Inactive Flows	0	0	0	0
Attrition	1981 Age distribution retirement at 65	1981 age distribution retirement at 65	1981 Age distribution retirement at 65	1981 Age distribution retirement at 65

TABLE VII.G.3

AGE STRUCTURE OF DENTAL MECHANICS

BY PROVINCE AND REGION

AGE GROUP	BRITISH COLUMBIA	ALBERTA	SASKATCHEWAN	MANITOBA	TOTAL #	TOTAL %
24 or less	2	3	-	-	5	1.2
25 - 29	20	26	9	2	57	13.6
30 - 34	17	24	12	11	64	15.3
35 - 39	23	15	9	6	53	12.7
40 - 44	13	8	7	5	33	7.8
45 - 49	20	11	6	8	45	10.8
50 - 54	32	16	3	8	59	14.1
55 - 59	22	12	5	5	44	9.6
60 - 64	15	13	3	5	36	8.6
65 & over	11	8	1	2	22	5.3
Unknown	-	-	-	-		
Total	175	136	55	52	418	100.0

GENERAL ASSUMPTIONS

Manpower Stock

Table VII.0.1, opposite, contains the total number of dental mechanics registered in Western Canada. It contains those practitioners who are active in their respective provinces as identified by the sources noted at the bottom of the table.

Factors Affecting Manpower Supply

The assumptions made with respect to each of the factors which have the potential to affect manpower stock are shown opposite in Table VII.0.2. These factors include migration, immigration, occupational shifts, training output, active/inactive movements, and attrition. For each assumption, the information source has been identified. The age distribution for dental mechanics is shown in Table VII.0.3.

Estimating Requirements

- Historical Ratio

  For each province, the current ratio of dental mechanics to population was used to project the number of practitioners required in the future to maintain the current level of manpower.

- Utilization

  Given the current unavailability of stable utilization data, statistics obtained from the Alberta Health Care Insurance Commission, Extended Benefits Plan, of the total number of insured services provided be dental mechanics were used as the basis for utilization projections. This plan provides coverage for the over 65 age group, which represents the largest consumer group for

removable prosthetic appliances. It was assumed that the ratio of removable prosthetic appliances used by the over-65 age group to the total number of removable appliances would remain constant during the forecast period. The per capita utilization rate for Alberta was applied to the over-65 age distribution in each province.

. Service Target Ratio

For this occupational group, no service target information was available, hence no projections were made using this approach.

Sensitivity Analysis

For the Province of Saskatchewan, which currently has a training agreement with the Northern Alberta Institutue of Technology, the effect of not renewing this agreement was estimated.

TABLE VII.1.1

NUMBER OF DENTAL MECHANICS

IN BRITISH COLUMBIA, 1970 TO 1980

YEAR	ROLL CALL 79	DENTURISTS SOCIETY OF BRITISH COLUMBIA
1970		115
1977	137	
1978	189	140
1979	147	184
1980		167

PROVINCIAL ASSUMPTIONS

BRITISH COLUMBIA

a) Legal Controls

The Dental Technicians Act (RS Chapter 91, 1979) appoints a board, known as the Dental Technicians Board, which administers both the dental mechanics and the dental laboratory technicians in the province. The act outlines the services which the dental mechanic may provide and the regulations under which this practitioner may perform these services.

The certification and licensing requirements are shown in Appendix 2 - Scope and Control of Practice.

b) Insured Services

The recently introduced Dental Care Plan of British Columbia provides up to 50% of dental costs, to a maximum of $700 per annum, to a number of special interest groups in the province. For all of these groups, full upper and lower, or partial dentures are included in the coverage.

To date, limited utilization data is available, and no consistent utilization trends have yet been determined.

c) Assumptions

- Manpower Stock

  Table VII.1.1, opposite, contains the total number of dental mechanics practising in British Columbia. The age distribution,

TABLE VII.1.2

TOTAL NUMBER OF ACTIVE DENTAL MECHANICS

IN BRITISH COLUMBIA, BY AGE

AGE GROUP	MALE	FEMALE	TOTAL
20 - 24	2	-	2
25 - 29	19	1	20
30 - 34	16	1	17
35 - 39	21	2	23
40 - 44	10	3	13
45 - 49	19	1	20
50 - 54	30	2	32
55 - 59	22	-	22
60 - 64	45	-	15
65 and over	11	-	11
Unknown	-	-	-
Total	165	10	175

Source: Dental Technicians Board of British Columbia

TABLE VII.1.3

FACTORS AFFECTING MANPOWER SUPPLY

DENTAL MECHANICS, BRITISH COLUMBIA

FACTOR	ASSUMPTION	SOURCE
Opening Stock	175	D.T.B.B.C.[1]
Net Migration	1 practitioner entering province every second year	D.T.B.B.C.
Net Immigration	0	D.T.B.B.C.
Net Occupational Shifts	0	D.T.B.B.C.
Training Output	6-8:1981-1983, 8-10:1984-1985 8 annually after 1985	Denturist's Society of British Columbia
Active/Inactive	0	Denturist's Society of British Columbia
Attrition	Current age distribution, assuming retirement at age 65	

Note: Dental Technicians Board of British Columbia

TABLEVII.1.4 MANPOWER REQUIREMENT

PROVINCE: BRITISH COLUMBIA

OCCUPATION: DENTAL MECHANICS

		PROJECTED MANPOWER REQUIREMENTS					
YEAR	PROJECTED STOCK	POPULATION APPROACH 1:14990			UTILIZATION-BASED* ON ALBERTA FIGURES		
		LOW	MEDIUM	HIGH	LOW	MEDIUM*	HIGH
1981	169	169	170	172	172	172	172
	NET	0	1	3	3	3	3
1982	173	171	174	175	176	177	177
	NET	-2	1	2	3	4	4
1983	178	174	177	179	180	181	181
	NET	-4	-1	1	2	3	3
1984	184	177	181	183	184	185	186
	NET	-7	-3	-1	0	1	2
1985	191	180	184	187	190	191	192
	NET	-11	-7	-4	-1	0	1
1990	211	193	202	207	219	221	222
	NET	-18	-9	-4	8	10	11
1995	222	205	217	226	240	243	246
	NET	-17	-5	-4	18	21	24
2000	244	215	231	243	256	261	265
	NET	-29	-13	-1	12	17	21

Note: The asterisked column (*) represents the most likely scenario for this occupation in British Columbia.

shown in Table VII.1.2, is based on those practitioners currently registered by the Dental Technicians Board of British Columbia, and was used as the basis for future projections.

- Factors Affecting Manpower Supply

The assumptions made with respect to each of the factors which have the potential to affect manpower stock are shown in Table VII.1.3, opposite. These factors include migration, immigration, occupational shifts, training output, active/inactive movements, and attrition. For each assumption, the information source has been identified.

- Estimating Requirements

  - Historical Ratio

    The current ratio of dental mechanics to population, 1:15,700, was used to project the number of practitioners required in the future to maintain the current level of manpower.

  - Utilization

    As discussed in the General Assumptions section, Alberta estimates were used for projection purposes.

- Net Manpower Requirements

Table VII.1.4, opposite, shows the projected manpower requirements under each projection approach. The most likely scenario is based on the per capita service utilization approach, estimated from the Alberta experience, under the medium population projection. This analysis shows a changing pattern in manpower requirements in the forecast period. This indicates a requirement for approximately 1 additional practitioner per year.

TABLE VII.2.1

NUMBER OF CERTIFIED DENTAL MECHANICS

IN ALBERTA, 1977 TO 1980

YEAR	
1977	122[1]
1978	123[1]
1979	127[1]
1980	136[2]

Notes:
1. Alberta Board of Examiners for Certified Dental Mechanics, based on number of persons who were registered with the Alberta Board of Examiners. Reported in Health and Social Services Manpower In Alberta, 1979.
2. Registry of the Alberta Board of Examiners for Certified Dental Mechanics.

TABLE VII.2.2

TOTAL NUMBER OF ACTIVE DENTAL MECHANICS

IN ALBERTA, BY AGE,

AGE GROUP	MALE	FEMALE	TOTAL
20 - 24	1	2	3
25 - 29	24	2	26
30 - 34	18	6	24
35 - 39	14	1	15
40 - 44	6	2	8
45 - 49	9	2	11
50 - 54	15	1	16
55 - 59	11	1	12
60 - 64	13	-	13
65 and over	8	-	8
Unknown	-	-	-
Total	119	17	136

Source: Alberta Board of Examiners for Certified Dental Mechanics, 1980 Registry, excluding those practitioners not residing in the Province of Alberta.

ALBERTA

a) Legal Controls

The Dental Mechanics Act (RSA 1970, C 92) establishes a board of certification which controls training requirements for certification examination, and establishes regulations to govern the practice of certified dental mechanics in Alberta.

The certification and licensing requirements are shown in Appendix 2 - Scope and Control of Practice.

b) Insured Services

The Extended Health Benefits plan of the Alberta Health Care Insurance Plan provides dental goods and services, in addition to optical goods and services, for registrants aged 65 or over and their spouses and dependents. A complete or partial dental plate, or a reset is covered once in every five years, and a reline or rebase once in every two years.

c) Assumptions

- **Manpower Stock**

  Table VII.2.1, opposite, contains the total number of dental mechanics registered in Alberta. It contains those practitioners who are currently certified by the Board of Examiners, and residing in the Province of Alberta. The age distribution of these practitioners is provided in Table VII.2.2.

TABLE VII.2.3

FACTORS AFFECTING MANPOWER SUPPLY

DENTAL MECHANICS, ALBERTA

FACTOR	ASSUMPTION	SOURCE
Opening Stock	136	A.B.E.C.D.M.[1]
Net Migration	1 every 2nd year	A.C.D.M.S.[2]
Net Immigration	0	A.C.D.M.S.[2]
Net Occupational Shifts	0	A.C.D.M.S.[2]
Training Output	8 per year	N.A.I.T.[3]
Active/Inactive	0	A.C.D.M.S.[2]
Attrition	Based on current age distribution, assuming retirement at age 65	

Notes: 1. Alberta Board of Examiners for Certified Dental Mechanics.
2. Alberta Certified Dental Mechanic Society
3. Northern Alberta Instititue of Technology

TABLE VII.2.4 MANPOWER REQUIREMENTS

PROVINCE: ALBERTA

OCCUPATION: DENTAL MECHANICS

	PROJECTED MANPOWER REQUIREMENTS						
YEAR	PROJECTED STOCK	POPULATION APPROACH 1:15310			UTILIZATION*		
		LOW	MEDIUM	HIGH	LOW	MEDIUM*	HIGH
1981	135	139	141	142	138	138	138
	NET	4	6	7	3	3	3
1982	142	143	146	147	143	143	143
	NET	1	4	5	1	1	1
1983	148	146	152	152	146	148	148
	NET	-2	4	4	-2	0	0
1984	152	149	157	157	151	152	153
	NET	-3	5	5	-1	0	1
1985	155	153	162	163	155	158	158
	NET	-2	7	8	0	3	3
1990	182	167	185	191	181	186	186
	NET	-15	3	9	-1	4	4
1995	203	181	206	220	205	211	213
	NET	-22	3	17	2	8	10
2000	230	194	228	248	227	234	238
	NET	-36	-2	18	-3	4	8

Note: The asterisked column (*) represents the most likely scenario for this occupation in Alberta.

- Factors Affecting Manpower Supply

The assumptions made with respect to each of the factors which have the potential to affect manpower stock are shown in Table VII.2.3, opposite. These factors include migration, immigration, occupational shifts, training output, active/inactive movements, and attrition. For each assumption, the information source has been identified.

- Estimating Requirements

  - Historical Ratio

The current ratio of dental mechanics to population, 1:15,310, was used to project the number of practitioners required in the future to maintain the current level of manpower.

  - Utilization

Statistics obtained from the Alberta Health Care Insurance Commission, Extended Benefits Plan of the total number of insured services provided by dental mechanics were used as the basis for utilization projections.

- Net Manpower Requirements

Table VII.2.4, opposite, shows the projected manpower requirements under each projection approach. The most likely scenario is based on the per capita service utilization approach, under the medim population projection. This analysis shows a changing pattern in manpower requirements in the forecast period, but overall there is a limited requirement for additional practitioners.

SASKATCHEWAN

a) Legal Controls

The Denturists Act (Chapter D-7, R.S.S. 1978) is the act regulating the practice of denturists in the Province of Saskatchewan. In the act, a denturist is defined as a person who provides a dental prosthetic service including making, fitting, constructing, altering, reproducing or repairing a complete upper or lower removable prosthetic denture.

In addition, subject to passing an examination, denturists may dispense partial dentures, and be classified as a partial denture technician.

The certification and licensing requirement are shown in Appendix 2 - Scope and Control of Practice.

b) Insured Services

The Medical Services Division administers the payments for certain non-insured health services to persons receiving assistance under programs administered by Saskatchewan Social Services, including Assistance Plan beneficiaries, government wards, and inmates of correctional institutions.

Under this plan, certain dental services including preventive, restorative, exodontic, orthodontic and prosthetic dentistry are insured. As of January 1, 1980, dentures may be obtained from either a dentist or a denturist.

TABLE VII.3.1

NUMBER OF DENTURISTS

IN SASKATCHEWAN, 1978 TO 1980

YEAR	SASKATCHEWAN HEALTH MANPOWER ANNUAL REPORT (1978)	DENTURISTS SOCIETY OF SASKATCHEWAN
1970		
1971		
1972		
1973		
1974		
1975		
1976		
1977		
1978	53	43
1979	-	54
1980	-	55

TABLE VII.3.2

TOTAL NUMBER OF ACTIVE DENTURISTS,

IN SASKATCHEWAN BY AGE, 1981

AGE GROUP	MALE	FEMALE	TOTAL
20 - 24	-	-	-
25 - 29	9	-	9
30 - 34	12	-	12
35 - 39	9	-	9
40 - 44	7	-	7
45 - 49	6	-	6
50 - 54	3	-	3
55 - 59	4	1	5
60 - 64	3	-	3
65 and over	1	-	1
Unknown	-	-	-
Total	54	1	55

Source: Denturist Society of Saskatchewan

TABLE VII.3.3

FACTORS AFFECTING MANPOWER SUPPLY

OF DENTURISTS, SASKATCHEWAN

FACTOR	ASSUMPTION	SOURCE
Opening Stock	55	D.S.S.
Net Migration	0	D.S.S.
Net Immigration	0	D.S.S.
Net Occupational Shifts	0	D.S.S.
Training Output	2 1981	D.S.S.
	3 per year 1982-2000	
Active/Inactive	0	D.S.S.
Attrition	1981 age distribution	D.S.S.
	retirement at 65	

Note: D.S.S. is Denturist Society of Saskatchewan

c) Assumptions

- Manpower Stock

Table VII.3.1, opposite, contains the total number of denturists registered in Saskatchewan. The 1980 figure excludes those practitioners working in other occupations, or otherwise not practising as denturists.

As of December, 1979, 50 of 54 registered denturists were licensed to provide partial dentures.

The age distribution of practitioners is shown in Table VII.3.2

- Factors Affecting Manpower Supply

The assumptions made with respect to each of the factors which have the potential to affect manpower stock are shown in Table VII.3.3, opposite. These factors include migration, immigration, occupational shifts, training output, active/inactive movements, and attrition. For each assumption, the information source has been identified.

- Estimating Requirements

  - Historical Ratio

The current ratio of denturists to population, 1:17,550, was used to project the number of denturists required in the future to maintain the current level of manpower.

TABLE VII.3.4 MANPOWER REQUIREMENTS

PROVINCE: SASKATCHEWAN

OCCUPATION: DENTURISTS

		PROJECTED MANPOWER REQUIREMENTS					
YEAR	PROJECTED STOCK	POPULATION APPROACH 1:17550			UTILIZATION-BASED* ON ALBERTA FIGURES		
		LOW	MEDIUM	HIGH	LOW	MEDIUM*	HIGH
1981	56	56	56	57	56	56	57
	NET	0	0	1	0	0	0
1982	59	56	56	58	57	58	58
	NET	-3	-3	-1	-2	-1	-1
1983	62	57	57	60	59	59	59
	NET	-5	-5	-2	-3	-3	-3
1984	65	57	58	61	60	60	61
	NET	-8	-7	-4	-5	-5	-4
1985	65	58	59	62	61	62	62
	NET	-7	-6	-3	-4	-3	-3
1990	75	60	63	68	68	68	69
	NET	-15	-12	-7	-7	-7	-6
1995	87	62	67	75	72	72	74
	NET	-25	-20	-12	-15	-15	-13
2000	97	63	70	81	74	75	77
	NET	-34	-27	-16	-23	-22	-20

Note: The asterisked column (*) represents the most likely scenario for this occupation in Saskatchewan.

- Utilization

  As discussed in the General Assumptions section, Alberta estimates were used for projection purposes.

- Sensitivity Analysis

For this occupation, the potential impact of terminating the current training agreement for 3 places at N.A.I.T. was assessed.

- Net Manpower Requirements

Based on the assumption of continued output from the contracted training places at N.A.I.T., there is a projected surplus of manpower in the forecast period. The net manpower requirements under each projection approach are shown in Table VII.3.4, opposite. The most likely scenario is based on the service utilization approach, derived from the Alberta experience, under the medium population projection.

While the potential impact of a decline in usage of prosthetic devices has not been analyzed, the effect of this trend would be to further emphasize the potential surplus.

Under an assumption of interrupted training after the expiry of the training contract, there is a projected requirement for 17 additional practitioners by the year 2000. This, however, was not considered to be the most likely.

TABLE VII.4.1

NUMBER OF DENTAL MECHANICS

IN MANITOBA, 1973 TO 1980

YEAR	HEALTH MANPOWER PROVINCIAL REPORT, MANITOBA, 1979
1970	
1971	
1972	
1973	54
1974	51
1975	56
1976	54
1977	54
1978	55
1979	54
1980	52[1]

Notes: 1. Manitoba Dental Mechanics Board

MANITOBA

a) Legal Controls

The Dental Mechanics Act, (SM 1970, C.103-Cap D35) defines the regulations controlling the practice of dental mechanics in the province.

The certification and licensing requirements are shown in Appendix 2 - Scope and Control of Practice.

b) Insured Services

Currently, the Health Services Commission provides for payment for certain dental services, including prosthetic devices, for welfare recipients and individuals with cleft palates.

Consideration is being given to an extended dental care plan similar to that recently introduced in the Province of British Columbia.

c) Assumptions

- Manpower Stock

  Table, VIII.4.1, opposite, contains the total number of dental mechanics registered in Manitoba. The 1980 figure includes all practitioners currently registered with the Department of Health. For purposes of projecting future manpower requirements, it is assumed that all practitioners are working in a fulltime capacity.

TABLE VII.4.2

TOTAL NUMBER OF ACTIVE LICENSED

DENTAL MECHANICS IN MANITOBA, BY AGE

AGE GROUP	MALE	FEMALE	TOTAL
25 - 30	2	-	2
31 - 35	11	-	11
36 - 40	6	-	6
41 - 45	5	-	5
46 - 50	8	-	8
51 - 55	8	-	8
56 - 60	5	-	5
61 - 65	5	-	5
66 - 70	2	-	2
Total	52	-	52

Source: Manitoba Dental Mechanics Board

TABLE VII.4.3

FACTORS AFFECTING MANPOWER SUPPLY

DENTAL MECHANICS, MANITOBA

FACTOR	ASSUMPTION	SOURCE
Opening Stock	52	M.D.M.B.[1]
Net Migration	0	D.A.M.[2]
Net Immigration	0	D.A.M.
Net Occupational Shifts	0	D.A.M.
Training Output	1 every second year	D.A.M.
Active/Inactive	0	D.A.M.
Attrition	Based on retirement at age 65 and using age distribution provided by Manitoba Dental Mechanics Board	

Notes: 1. Manitoba Dental Mechanics Board
2. Denturist's Association of Manitoba

TABLE VII.4.4 MANPOWER REQUIREMENTS

PROVINCE: MANITOBA

OCCUPATION: DENTAL MECHANICS

		PROJECTED MANPOWER REQUIREMENTS					
YEAR	PROJECTED STOCK	POPULATION APPROACH 1:20000			UTILIZATION-BASED* ON ALBERTA FIGURES		
		LOW	MEDIUM	HIGH	LOW	MEDIUM*	HIGH
1981	50	52	52	52	53	53	53
	NET	2	2	2	3	3	3
1982	49	52	53	53	54	54	54
	NET	3	4	4	5	5	5
1983	49	53	53	53	55	55	55
	NET	4	4	4	6	6	6
1984	48	53	53	54	56	56	56
	NET	5	5	6	8	8	8
1985	48	53	54	54	57	57	57
	NET	5	6	6	9	9	9
1990	45	55	55	56	62	63	63
	NET	10	10	11	17	18	18
1995	40	56	57	58	65	65	65
	NET	16	17	18	25	25	25
2000	34	57	58	60	66	66	66
	NET	23	24	26	32	32	32

Note: The asterisked column (*) represents the most likely scenario for this occupation in Manitoba.

The age distribution of dental mechanics is shown in Table VII.4.2., opposite.

- Factors Affecting Manpower Supply

The assumptions made with respect to each of the factors which have the potential to affect manpower stock are shown in Table VII.4.3, opposite. These factors include migration, immigration, occupational shifts, training output, active/inactive movements, and attrition. For each assumption, the information source has been identified.

- Estimating Requirements

  - Historical Ratio

    The current ratio of dental mechanics to population, 1:20,000, was used to project the number of dental mechanics required in the future to maintain the current level of manpower.

  - Utilization

    As discussed in the General Assumptions section, Alberta estimates were used for projection purposes.

- Net Manpower Requirements

Table VII.4.4, opposite, shows the projected manpower requirements under each projection approach. The most likely scenario is based on the service utilization approach derived from the Alberta experience, under the medium population projection. This analysis indicates a requirement for additional dental mechanics, and could indicate the requirement under a potential plan covering prosthetic services for the over 65 age group.

APPENDIX III - SCOPE OF PRACTICE

DENTAL MECHANICS: CONTROL OF PRACTICE

PROVINCE	CERTIFICATION/LICENSING/REGISTRATION			TRAINING PROGRAM/ACCREDIATION		
	REQUIRED CHARACTERISTICS OF APPLICANTS	CERTIFICATION REQUIREMENTS	LICENSING REQUIREMENTS	LENGTH OF TRAINING & ADMISSION REQUIREMENTS	TRAINING LOCATION	EDUCATIONAL ACCREDITATION
British Columbia Dental Technicians Act, 1958, C.13, S.1 Page 1072-2	. Good character		. Pass prescribed examination if apprenticed in B.C. or N.A.I.T. graduate by Dental Technician Board. . If licensed dental mechanic elsewhere in Canada. . If external to Canada required to write & pass examination for dental laboratory technician & dental mechanics.	. 2 four week, 2 six week modules constitutes the school based component of the four year apprenticeship program. . Two year full-time program. . Alberta Grade 12 equivalent.	. Vancouver Community College, Vancouver Vocational Institute. . Graduates from 2 year Certificate Program at N.A.I.T.	
Alberta R.S.A. 1970 Chapter 92	. 18 years of age . Good character . Name not erased from the register of any dental mechanics society.		. Successful completion of exam pursuant to the act. . 2 year certificate program plus 2 years practical experience	. 2 year certificate program. . Alberta Grade 12 or equivalent, with courses in Mathematics and Chemistry.	. N.A.I.T.	
Saskatchewan R.S.S. 1978 Chapter D7	. 18 years of age . Good moral character		. To license as a Denture Technician must take a course in upper & lower dentures. . Pass prescribed exam . Partial denture technician must pass examination of board of examiners.	. 2 year program at N.A.I.T. . Alberta Grade 12 or equivalent, with courses in mathematics and chemistry.	. No training program located in Saskatchewan . Training agreement between province of Sask. and Alta. for 3 places annually at N.A.I.T.	

PROVINCE	CERTIFICATION/LICENSING/REGISTRATION			TRAINING PROGRAM/ACCREDIATION		
	REQUIRED CHARACTERISTICS OF APPLICANTS	CERTIFICATION REQUIREMENTS	LICENSING REQUIREMENTS	LENGTH OF TRAINING & ADMISSION REQUIREMENTS	TRAINING LOCATION	EDUCATIONAL ACCREDITATION
Manitoba S.M. 1970 C.103 Chapter D.35	. Resident of Manitoba . Grade 11 or equivalent		. Successful completion of training program and apprenticeship program. . Successful completion of examination.		. No formal training programs in the province.	

APPENDIX IV - BIBLIOGRAPHY

BIBLIOGRAPHY ON DENTAL MECHANICS

D.H.E.W. "A Report to the President and Congress on the Status of Health Professions Personnel in the United States" United States Department of Health, Education, and Welfare.

"Policy Paper on Continuing Education Programs for Health Personnel in Alberta." Alberta Helath and Social Services Disciplines Committee, February, 1980.

"Semi-Annual Survey of the Major Employers of Health and Social Services Personnel" Alberta Health and Social Services Disciplines Committee.

"Roll Call'79: A Status Report of Health Personnel in the Province of British Columbia", Report R-12.

Saskatchewan Health, Saskatchewan Health Manpower Annual Report 1978.

"Health and Social Service Manpower in Alberta 1979" Alberta Health and Social Services Disciplines Committee.

"Health Manpower Provincial Report, Manitoba 1979" Research Section, Manitoba Department of Health.

Health Manpower in Ontario - 1980 Strategic Research and Manpower Planing Branch, Ontario Ministry of Health, October, 1980.

"Status Report on Dentists and Dental Auxiliaries" Alberta Health and Social Services Disciplines Committee, February, 1979.

Lewis, M., Unpublished Report of Dental Health Care Needs of the Adult Population in the Province of Saskatchewan. Saskatchewan Health.

Rosenstein, D.I., et al, "Professional Encroachment: A Comparison of the Emergence of Denturists in Canada and Oregon" American Journal of Public Health. June, 1980.

Waldman, H.B., "Will Dentistry Eventually Make Use of Expanded Duties and Denturism". Dental Survey, November, 1976.

McKanday, L., "Canadian Denturist Advises United States Dentistry: Compromise" D.R., April, 1977.

Canadian Dental Association "Dental Health of Canadians - A Perspective", A Brief, March, 1980.

Kolar, M.J., "Changing Patterns of Health Care Delivery: Impact on Dental Auxiliaries" Educational Directions, Volume 2, No. 2.

"Dental Health of Canadians - A Perspective" A Brief, March, 1980, Canadian Dental Association.

Province of
British Columbia

Province of
Alberta

Province of
Saskatchewan

Province of
Manitoba

WESTERN CANADA
HEALTH MANPOWER TRAINING STUDY

Category # 2 - Report VIII

DENTAL NURSING

REPORT VIII
DENTAL NURSING:

THE REQUIREMENT FOR ALTERNATIVE TRAINING AND FUNDING ARRANGEMENTS IN WESTERN CANADA

REPORT VIII

DENTAL NURSING

THE REQUIREMENT FOR ALTERNATIVE TRAINING

AND FUNDING ARRANGEMENTS IN WESTERN CANADA

TABLE OF CONTENTS

PAGE

PREFACE

Study Background - General Introduction 1
Study Origins 1
Study Objectives 2
Study Timing 2
Occupation Definition 3

1. TRAINING NEEDS IN WESTERN CANADA

Introduction 4
Existing Training Programs 5
Occupational Issues 5

2. TRAINING RESPONSES

Decision Process 7
Timing and Location of Manpower Requirements 7
Indicated Training Responses 7
Defined Alternative Training Locations 7
Review of Funding Arrangements 8
Defined Length of Training Agreement 8

PAGE

3. TRAINING RECOMMENDATIONS 9

APPENDIX I - Study Approach and Methodology
APPENDIX II - Provincial Net Manpower Requirement
APPENDIX III - Scope of Practice
APPENDIX IV - Bibliography

PREFACE

Study Background - General Introduction

The provision of effective health services to the community is, to a considerable degree, dependent on three essential resources:

- an adequate supply of well trained specialist staff in each health occupation group
- the development of adequate facilities to service the community
- the availability of adequate funds to ensure cost effective and efficient health services.

The range and complexity of health treatment programs has expanded greatly in Canada during the last twenty-five years. In addition, changing technology and the development of new treatment programs have resulted in an increased requirement for skilled, adequately trained health manpower. These factors have resulted in an increased emphasis on manpower planning and skill training for health occupations to ensure an adequate supply of trained practitioners to meet defined manpower requirements.

Study Origins

The Western Canada Health Manpower Training Study was initiated by the Western Premiers at their annual conference in 1980. The study is under the direction of a Steering Committee comprised of government representatives from the Provinces of British Columbia, Alberta, Saskatchewan and Manitoba. The members of the Steering Committee represent both the Health and Education departments within each provincial government.

Study Objectives

The study terms of reference contain two major objectives. These are:

- to assess the existing and future needs for health manpower training programs and facilities in Western Canada

- to make recommendations for the rationalization of the location and funding of health manpower training programs and facilities in Western Canada.

Study Timing

The study consists of a review of 26 health occupations to be examined in five categories. The second category consists of four occupations, selected for the study on the basis of current availability of training programs in Western Canada. Although the study is divided into five categories for review, each occupation within these is to be studied independently over the next two years. Several of the occupations are inter-related. The requirement for one kind of manpower may be influenced by that of another, yet the two occupations may not be reviewed at the same time. Therefore, the study recommendations should be reviewed once all the occupations have been studied.

Occupation Definition

A dental nurse is defined as an individual who:

"is authorized to perform general dental functions including taking x-rays and administering local anaesthetics, routine preventive services, including prophylaxis and application of topical fluorides; restorative treatments, including doing permanent restoration in primary and permanent teeth and pulpotomy of primary teeth; surgical treatment, i.e. extraction of primary teeth and preventive orthodontic services including placement of space maintenances upon the advice of the regional dental consultant, and also taking impressions and fabricating dental study models."[1]

The primary function of the dental nurse, an expanded duty auxiliary, is to prepare and restore cavities in children's teeth after a training period of approximately two years. The preparation of cavities, and the extraction of teeth are among the features which distinguish dental nurses from other expanded duty auxiliaries, who merely restore cavities prepared by dentists. The underlying rationale for the introduction of the dental nurse is normally related to the unavailability of dentists. Where there is a shortage of dentists, it has proven effective to introduce auxiliaries, thereby reducing the burden on the fully trained professional dentists. The prototype program was developed in New Zealand, based on a 1913 survey which indicated that a large proportion of children showed dental neglect. The program commenced in 1923 when the first dental nurses graduated from a two year program. Several other countries followed the example of New Zealand, and in 1957 a program was set up in the United Kingdom.

1. Schedule A - Regulations Under the Saskatchewan Dental Nurses Act, 1973.

EXHIBIT 1

MANPOWER REQUIREMENTS

WESTERN CANADA, DENTAL NURSES

(BASED ON MOST LIKELY SCENARIO FROM EACH PROVINCE)

YEAR	PROJECTED STOCK	PROJECTED REQUIREMENT
1981	345	247
	NET	-98
1982	335	262
	NET	-73
1983	323	276
	NET	-47
1984	311	303
	NET	-8
1985	298	305
	NET	7
1990	229	325
	NET	96
1995	151	341
	NET	190
2000	82	343
	NET	261

1.0 TRAINING NEEDS IN WESTERN CANADA

1.1 Western Canada Overview

Exhibit 1, opposite, shows the projected stock and requirement for dental nurses during the period 1981 - 2000. These projections are based on the most likely scenario derived for the provinces of Saskatchewan and Manitoba, and show a surplus of dental nurses until 1984, and a requirement for additional dental nurses from 1985 until the year 2000.

Dental nurses are currently legislated to practice only in the provinces of Saskatchewan and Manitoba. In the province of Saskatchewan the most likely scenario was based on the medium population projection, and a service target ratio of 1:850, and an assumption that 90% of the children eligible for enrolment program participate in the program. It should be noted that the Saskatchewan Dental Care Program is currently being introduced, and children aged 4 to 18 will be covered effective 1984. In the province of Manitoba, the manpower requirements were projected based on the assumption that the current utilization of dental nurses in the Children's Dental Program would continue at the current level. It was also assumed that the existing level of coverage would be maintained in the future, with no increase. Although extensive records exist on the level of services provided under the two children's dental plans, these plans are in the introductory phase and insufficient historical utilization data exists on which to establish trends in utilization. The utilization approach for projecting manpower requirements was not attempted for this occupation.

The underlying rationale for the introduction of dental nurses into the dental health care system is based on the current

availability of dentists. Where there is an indicated shortage of dentists, it has proven effective to introduce expanded duty auxiliaries, thereby reducing the burden on fully trained professional dentists. At this time, only the provinces of Saskatchewan and Manitoba utilize dental nurses. Based on discussions with Provincial Dental Care Authorities, it has been assumed that there is sufficient capacity in the existing dental care system in British Columbia and Alberta to service the dental care needs of the child and adolescent population. We have further assumed that there is the potential for a surplus of dentists in each of these provinces in the immediate future. Based on these assumptions, it has been concluded that dental nurses will not be employed in British Columbia and Alberta during the projection period.

1.2 Existing Training Programs

The only program for training dental nurses in Canada is at the Wascana Institute of Applied Arts & Sciences, Regina, Saskatchewan. This two year program was established in 1972 to develop the necessary skills and knowledge to enable dental nurses to provide preventive and restorative dental services for pre-school and school aged children. For a more detailed discussion of these training programs, please refer to Report 2 - A "The Scope of Existing Training Programs - Category II Occupations."

1.3 Occupational Issues

The development of the child dental nurse program in western Canada is a recent innovation in the dental care system. The program was introduced into Saskatchewan in 1972 and operations commenced in 1974. Because of the nature of the program, the range of services is still being phased in, and the program will not be fully operational until 1984. At present, 98% of the active dental nurses practising in western Canada are female, and 92.7% of them are aged between

20 and 30. Because of the recent introduction of the program, there is limited historical experience on which to base estimates of working life expectation. The experience in Australia has been for a working life of approximately 8 years, and in New Zealand dental nurses are now spending, on average, almost 11 years in active service. In both countries, a number of nurses return to work after their children achieve school age. In the Saskatchewan Dental Plan, the annual attrition rate has varied each year from 17% in the initial year of the program to 12 1/2% in 1978 - 1979. In addition, there is limited information on the return of inactive dental nurses to the active labour market. The attrition rate may, potentially, be undergoing a period of stablization, in that the residual core of long service employees is still developing. Thus, estimates of attrition at the historical rate of between 15 - 17% may exaggerate the long-term trend in attrition. An assumed rate of 12% attrition per annum was used in the calculation of net manpower requirements for Saskatchewan, and 10% per annum was used in the projection of net manpower requirements for Manitoba.

The future of the Child Dental Care Program in Manitoba is currently under review and the future role of dental nurses is also being reviewed. At present, Manitoba has not contracted any training places in the Wascana training program, and the manpower projection indicates that, with the anticipated attrition rate, the supply of dental nurses in Manitoba will decline rapidly during the forecast period. By the year 1995 the projection indicates there will be no dental nurses working in the province of Manitoba. Thus, the projected manpower requirement in Manitoba is for an immediate and ongoing requirement for additional dental nurses throughout the forecast period.

EXHIBIT 2

NET MANPOWER REQUIREMENTS

MOST LIKELY SCENARIO

OCCUPATION: DENTAL NURSES

YEAR	SASKATCHEWAN		MANITOBA		REGION	
	STOCK	REQUIREMENT	STOCK	REQUIREMENT	STOCK	REQUIREMENT
1981	303	205	42	42	345	247
NET		-98		0		-98
1982	296	219	39	43	335	262
NET		-77		4		-73
1983	287	233	36	43	323	276
NET		-54		7		-47
1984	278	260	33	43	311	303
NET		-18		10		-8
1985	268	262	30	43	298	305
NET		-6		13		7
1990	214	280	15	45	229	325
NET		66		3C		96
1995	151	295	0	46	151	341
NET		144		46		190
2000	82	296	0	47	82	343
NET		214		47		261

Note: . Licensed to practice in Saskatchewan and Manitoba only

Most Likely Scenario

- Saskatchewan, service target 1:850 on an assumed utilization of 90% enrolment level
- Manitoba utilization at current level
- Medium population scenario

2.0 TRAINING RESPONSES

2.1 Decision Process

The decision process, outlined in Appendix I, and discussed in detail in Report C, "A Decision Process to Evaluate the Location of, and Funding Arrangements for Health Occupation Training Programs in Western Canada", was used to evaluate the training implications of the net manpower requirements for public health inspectors discussed in Section 1.1, above. This section contains the results of this analysis.

2.2 Timing and Location of Manpower Requirements

Exhibit 2, opposite, shows the projected manpower requirement for the period 1981 - 2000 for the provinces of Manitoba and Saskatchewan under the most likely scenario. As the exhibit indicates, there is an immediate surplus of dental nurses for Saskatchewan, and a requirement for these practitioners in Manitoba. The potential surplus of dental nurses lasts until 1984, after which time there is a growing requirement for dental nurses in the two provinces.

2.3 Indicated Training Responses

The preceding discussion indicates the need for increasing the supply of dental nurses. Changes in the assumptions on the level of attrition and on return from inactive status, do not significantly alter the manpower requirements, and further emphasize the requirement for additional training outputs. The size of these additional manpower requirements do not justify the development of additional training programs, but indicate an increase in output from the existing program at Wascana.

2.4 Defined Alternative Locations

At present, the indicated major manpower requirement is in the

province of Saskatchewan, and it is appropriate that the Wascana Institute continue to be the only program for the training of dental nurses in western Canada.

2.5 Review Funding Arrangements

At this time, the province of Manitoba has no formal training agreement with Saskatchewan to purchase places in the Wascana Institute program. Given the size of the indicated requirement for additional dental nurses in Manitoba, the province of Manitoba should enter into a formal training contract for five training places at Wascana commencing in 1982 for a period of five years. Subsequently, this enrolment should be reduced to three training places per year.

2.6 Defined Length of Training Agreement

The training contract between the province of Saskatchewan and the province of Manitoba for training places at Wascana Institute in the dental nursing program, should be for an initial period of five years.

3.0 TRAINING RECOMMENDATIONS

- That the Wascana Institute of Applied Arts and Sciences be recognized as the training program for the provinces of Saskatchewan and Manitoba for introductory dental nurse training.

- That the student enrolment for the province of Saskatchewan be increased by 8 places (to 33 per year) in 1983, and by an additional 10 places per year in 1988 (to 43 per year).

- That the province of Manitoba defer on decisions on the future training strategy for dental nursing until the review of the dental care system has been completed.

- That subsequent to the decision on the future role of the dental nurse in the provision of dental care, the province of Manitoba review the potential to contract training places in the dental nurse training program at Wascana Institute of Applied Arts and Sciences.

APPENDIX I

STUDY APPROACH AND METHODOLOGY

STUDY APPROACH

Introduction

In order to achieve the study objectives, the work program consists of three key activities. These are:

- the analysis of manpower supply and requirements, and the calculation of net manpower requirements
- the analysis of existing training programs for Western Canada
- the development of recommendations for alternative training locations and funding arrangements

Analysis of Manpower Supply and Requirements

The analysis of manpower supply and requirements is designed to allow for a variety of data inputs, and for different emphasis depending on the occupation under review. A variety of data sources are used including provincial and national associations, health insurance agencies, and provincial health and education departments. In all instances, data is developed independently of previously published sources.

In addition to the basic projection of net manpower requirements, a number of sensitivity analyses have been completed to assess the impact of changed in the factors affecting supply and requirements, prior to developing recommendations for either additional training programs, or expanding existing training programs.

Approaches to Determining Manpower Requirements

The approach developed to determine manpower requirements uses three methods of projection. These are discussed below.

1. Service Utilization Approach

The utilization approach is based on an analysis of the pattern of health service usage. It establishes trends in service utilization and projects these onto future population estimates. There are three steps in the service utilization approach.

Step 1 - Determine Per Capita Utilization Rate

Historical data of the number of services provided, by age and sex of recipient is derived. The number of services per age/sex group is then divided by the population for group in the corresponding year. This results in a per capita utilization rate.

Step 2 - Project Future Service Required

The per capita utilization rate is projected onto the low, medium and high population for each year from 1981 to 2000. This results in an estimate of total future services.

Step 3 - Estimated Number of Practitioners Required

Having determined the total future services, the model projects the number of practitioners required, by assuming a constant level of services per practitioner. The number of services per practitioner is determined by dividing total services by the number of practitioners in the base year. To estimate the required number of practitioners, the model divides total future services required by the number of services per practitioner.

2. Service Target Ratio Approach

Service target ratios reflect a theorectical optimal manpower level required to meet health service requirements in the occupation under review. They are expressed as the ratio of practitioner to population. The service target ratios are derived based on discussion with health authorities, review of published reports, articles and summary of defined health care needs.

3. Population Ratio Approach

Population ratios are derived by dividing the total population at a specific point in time by the number of active practitioners. This results in a ratio of practitioners to population.

These ratios are analysed to determine if any trends exists. To project futuren manpower requirements, the model divides total projected population by the previously determined population ratio.

Summary of Approaches to Projecting Manpower Requirements

The three approaches outlined above have been used for the calculation of manpower requirements for this occupation. The specific application of each approach to this occupation is discussed under General Assumption, Appendix II, following.

Development of Recommendations for Alternative Training Locations and Funding Arrangements

We have developed a decision process to assist in developing recommendations for alternative training location(s) and funding arrangements. This process is designed to allow for the logical, consistent evaluation of a range of training alternatives.

There are seven steps in the decision process:

- Step 1. Analysis of manpower requirements
- Step 2. Identification of the appropriate type(s) of training
- Step 3. Definition of alternative training locations
- Step 4. Evaluation of alternative locations for new programs
- Step 5. Establishment of timing of training program requirement
- Step 6. Recommendation on training action(s) and location(s)
- Step 7. Recommendation on funding alternative(s)

APPENDIX II

PROVINCIAL NET MANPOWER REQUIREMENTS

TABLE VIII.0.1

TOTAL NUMBER OF DENTAL NURSES IN WESTERN CANADA

YEAR	SASKATCHEWAN[1]	MANITOBA[2]
1975	46	-
1976	84	-
1977	115	-
1978	137	-
1979	169	43
1980	177	42

Notes: 1. Saskatchewan Health Dental Plan, Annual Report
2. Executive Director Dental Services

TABLE VIII.0.2

FACTORS AFFECTING MANPOWER SUPPLY

WESTERN CANADA

FACTOR	SASKATCHEWAN	MANITOBA
Opening Stock	300	45
Net Migration	-3	0
Net Immigration	0	0
Net Occupational Shifts	0	-3
Training Output	22-1981 25-1981-2000	0
Active/Inactive Flows	12% annual turnover	10% annual turnover
Attrition	1981 Age distribution retirement of 65	1981 Age distribution retirement at 65

NET MANPOWER REQUIREMENTS

GENERAL ASSUMPTIONS

Dental nurses are currently legislated in Saskatchewan and Manitoba.

Manpower Stock 1974 - 1980

The total number of dental nurses in Saskatchewan and Manitoba for the years 1974 - 1980 is displayed in Table VIII.0.1, opposite.

Factors Affecting Manpower Supply

Table VIII.0.2,opposite shows the assumptions with respect to each of the factors which have the potential to affect stock.

- Net Migration

  Because of the limited employment opportunities, migration into and out of Saskatchewan and Manitoba has been limited.

- Net Immigration

  In the initial years of the program, subsequent to its introduction, dental nurses were recruited from New Zealand and the United Kingdom. Subsequent to the first graduating from Wascana Institute, the number of immigrants has been reduced, and in recent years the manpower requirements have been met from the training program.

- Net Occupational Shifts

  There is a potential career progression from dental assistant, to dental nurse, to dental hygienist. The post-graduate module in

dental hygiene has been made available to allow dental nurses to expand their scope, and increase the employment opportunities. At this time it is estimated that there are approximately 15 to 20 dental nurses who have qualified as dental hygienists and are currently working in this capacity.

. Training Output

The enrolments at Wascana Institute have been controlled to ensure an adequate supply of dental nurses. Outputs have varied based on the anticipated demand for manpower, with a maximum output of 72 in 1979 (including 33 graduates for the Province of Manitoba), to an anticipated output of 21 in 1981, 22 in 1982 and 1983, and an assumed output of 25 per year from 1984 until the year 2000.

. Active to Inactive

Ninety-eight percent of the active dental nurses are female. The program for dental nurses in Saskatchewan and Manitoba are of recent introduction, and there is limited historical experience on which to base estimates of working life expectation. The experience in Australia was for an average working life of 8 years, and in New Zealand nurses are now spending, on average, almost 11 years in active service. In both countries a number of nurses return to work after their children achieve school age. In the Saskatchewan Dental Plan, the annual attrition rate has varied each year from 17% of the initial year of the program, to 12 1/2% in 1978 - 1979. Two estimates of annual attrition were prepared based on assumed rates of 15% and 12% annual attrition.

To date, there is limited information on the return of inactive dental nurses to the active labour market. Estimates were

TABLE VIII.0.3

AGE STRUCTURE OF DENTAL NURSES

BY PROVINCE AND REGION

AGE GROUP	SASKATCHEWAN	MANITOBA	TOTAL #	TOTAL %
24 or less	116	34	150	45.9
25 - 29	145	8	153	46.8
30 - 34	19	2	21	6.4
35 - 39	1	1	2	0.6
40 - 44	-	-		
45 - 49	-	-		
50 - 54	-	-		
55 - 59	-	-		
60 - 64	1	-	1	0.3
65 & over	-	-		
Unknown	-	-		
Total	282	45	327	100

obtained on the projected size of the inactive labour pool and it was assumed that 10% of these inactive dental nurses would be available to return to the labour market.

. Attrition from death and retirement

Ninety-two percent of the active dental nurses are aged 20 to 30. Attrition has been estimated using the 1981 age distribution, and automatically retiring individuals at age 65. Table VIII.0.3, opposite, shows the age distribution of dental nurses for Saskatchewan and Manitoba.

Requirements

. Historical Ratios

The current ratio of dental nurses to population in each of the two provinces was used to project the number of dental nurses required to maintain the current level of services in the future.

. Utilization

Although extensive records exist on the level of services provided under the dental plan, the plan is still in its introductory phase, and insufficient historical utilization data exists on which to establish trends. The utilization approach was not attempted for this occupation.

. Service Target Ratio

Two service target ratios were identified for projecting the manpower requirements for dental nurses. For the age group 14 to 18, it was assumed that one dental nurse per 900 population was

required and for the age group 4 to 13, it was assumed a ratio of 1 dental nurse to 800 population was sufficient. Both of these ratios were obtained from Executive Director, Dental Plan, Saskatchewan Health. For both provinces employing dental nurses, a ratio of 1:850 was used for projecting future requirements.

Productivity

Because of the limited information on utilization no assumptions have been made on productivity increases for dental nurses. The potential productivity improvement appears to be limited, as the nurses in the program currently use the high speed drill.

Sensitivity Analysis

A number of strategies and solutions pertaining to manpower mobility, productivity and occupation incentives may represent more appropriate responses to manpower requirements than the alteration of training output. The theoretical basis for these alternative solutions is discussed in Report D, Section I. In this section we discuss the factors considered in the sensitivity analysis for this occupation.

. Occupational Movements

Because of the limited historical information on attrition rates two assumptions were made. The official manpower requirement projections for the Dental Plan, Saskatchewan Health, have assumed an attrition rate of 15% per annum. Because of the recent introduction of the program, the actual annual attrition rates of dental nurses may, in fact, be higher in this initial period of the plan, than in subsequent years. The residual core of manpower is still building, and, based on the experience of Australia and New Zealand, an alternative assumption 12% annual attrition was analyzed.

TABLE VIII.3.1

NUMBER OF DENTAL NURSES

IN SASKATCHEWAN, 1974 TO 1980

YEAR	SASKATCHEWAN HEALTH MANPOWER ANNUAL REPORT 1978	SASKATCHEWAN HEALTH DENTAL PLAN ANNUAL REPORT[2]	SASKATCHEWAN DENTAL NURSES BOARD
1973	-	-	12
1974	-	-	70
1975	-	46	129
1976	169	84	169
1977	202	115	202
1978	239	137	239
1979	N/A	169	286[1]
1980	N/A	177	311[1]

Notes:
1. Estimates of the total number registered minus estimated losses resulting from migration
2. From Annual Report Saskatchewan Dental Plan 1975 - 1979-80, shows the number of staff in permanent and temporary positions in the Dental Plan effective June 30th of respective year.

PROVINCIAL ASSUMPTIONS

SASKATCHEWAN

a) Legal Controls

The definition of dental nurse is given above in Section 2.1. This definition is contained in Schedule A of the Regulations under the Dental Nurses Act, 1973.

The certification and licensing requirements are shown in Appendix 2 - Scope and Control of Practice.

b) Insured Services

The Dental Care Act, RSS 1978 Chapter 4, defines basic preventive dental services provided to all persons born between 1966 and 1976. Basic coverage is provided until age 14, and it is planned to expand this coverage to enable current recipients to receive dental care until age 18.

c) Assumptions

- Manpower Stock

  Table VIII.3.1, opposite, contains the total number of dental nurses registered in Saskatchewan. The count for the Saskatchewan Health Dental Plan annual report shows those dental nurses

TABLE VIII.3.2

TOTAL NUMBER OF ACTIVE DENTAL NURSES,

SASKATCHEWAN BY AGE, 1981

AGE GROUP	MALE	FEMALE	TOTAL
20 - 24	2	114	116
25 - 29	2	143	145
30 - 34	2	17	19
35 - 39	-	1	1
40 - 44	-	-	-
45 - 49	-	-	-
50 - 54	-	-	-
55 - 59	-	-	-
60 - 64	-	1	1
65 and over	-	-	-
Unknown	-	-	-
Total	6	276	282

Source: Secretary, Saskatchewan Dental Nurses Board

TABLE VIII.3.3

FACTORS AFFECTING MANPOWER SUPPLY

DENTAL NURSES, SASKATCHEWAN

FACTOR	ASSUMPTION	SOURCE
Opening Stock	300	S.D.N.B.
Net Migration	-3	S.D.N.B.
Net Immigration	0	S.D.N.B.
Net Occupational Shifts	0	S.D.N.B.
Training Output	22-1981, 25-1982-2000	Wascana Institute
Active/Inactive	Calculated at 12% annual staff turnover	S.D.N.B.
Attrition	1981 age distribution retirement at 65	S.D.N.B.

Note: S.D.N.B. is the Saskatchewan Dental Nurses Board

TABLE VIII.3.4 MANPOWER REQUIREMENTS

PROVINCE: SASKATCHEWAN

OCCUPATION: DENTAL NURSES

		PROJECTED MANPOWER REQUIREMENTS					
					SERVICE TARGET		
YEAR	PROJECTED	POPULATION			1:850 - ASSUMES		
	STOCK	APPROACH 1:5450			90% ENROLMENT LEVEL		
		LOW	MEDIUM	HIGH	LOW	MEDIUM*	HIGH
1981	303	179	179	185	205	205	211
	NET	-124	-124	-118	-98	-98	-92
1982	296	180	182	188	218	219	227
	NET	-116	-114	-108	-78	-77	-69
1983	287	182	184	192	230	233	242
	NET	-105	-103	-95	-57	-54	-45
1984	278	184	187	196	256	260	272
	NET	-94	-91	-82	-22	-18	-6
1985	268	186	190	199	257	262	275
	NET	-82	-78	-69	-11	-6	7
1990	214	194	203	220	266	280	302
	NET	-20	-11	-6	52	66	88
1995	151	199	215	240	274	295	330
	NET	48	64	89	123	144	179
2000	82	203	225	260	266	296	342
	NET	121	143	178	184	214	260

Note: The asterisked column (*) represents the most likely scenario for this occupation in Saskatchewan.

employed in the plan. In addition, it is estimated that there are 28 dental nurses employed by private practice and by the Department of Northern Saskatchewan. It is also estimated that there are approximately 311 nurses in the province, and 282 are currently registered with the Saskatchewan Dental Nurses Board. The age distribution is shown in Table VIII.3.2.

- Factors Affecting Manpower Supply

The assumptions made with respect to each of the factors which have the potential to affect manpower stock are shown in Table VIII.3.3, opposite. These factors include migration, immigration, occupational shifts, training output, active/inactive movements, and attrition. For each assumption, the information source has been identified.

- Estimating Requirements

  - Historical Ratio

    The current ratio of dental nurses to population, 1:5,414 was used to project the number of dental nurses required in the future to maintain the current level of manpower.

  - Service Target Ratio

    A ratio of 1 dental nurse to 850 population was used.

- Net Manpower Requirements

The net manpower requirements under each projection approach are shown in Table VIII.3.4, opposite. The most likely scenario is

based on a service target ratio of 1:850, and an assumed enrolment level of 90% in the program under the medium population projection. On the basis of this analysis, there is a projected surplus of manpower until the year 1990, followed by a requirement for additional dental nurses.

TABLE VIII.4.1

NUMBER OF DENTAL NURSES

IN MANITOBA, 1979 AND 1980

YEAR	EXECUTIVE DIRECTOR DENTAL SERVICES DIVISION
1979	43
1980	42

Source: Executive Director, Dental Services Division, Province of Manitoba

MANITOBA

a) Legal Controls

The definition of dental nurse is given in the Manitoba Regulation 122/76 under The Dental Health Workers Act (Bill 53, Chapter 35) as "a person working under the supervision of a dentist, who is employed by the Government of Manitoba or any agent thereof, who is graduated from a school of dental nursing recognized by the board and who is the holder of a valid and subsisting certificate issued by the board."

The certification and licensing requirements are shown in Appendix 2 - Scope and Control of Practice.

b) Insured Services

The Dental Health Services Act (SM 1975,C34, Cap. D33) defines the services which are covered, and Manitoba Regulation 122/76 (clause 19, Part B) defines the services provided by a dental nurse. Participation in the program is for children aged 6 to 13, residing in defined school districts and divisions in the province.

c) Assumptions

- Manpower Stock

  Table VIII.4.1, opposite, contains the total number of dental nurses registered in Manitoba. The count includes those nurses curently employed by the Manitoba Children's Dental Program, and also those nurses working in private dental offices.

TABLE VIII.4.2

TOTAL NUMBER OF ACTIVE DENTAL NURSES,

MANITOBA BY AGE, 1981

AGE GROUP	MALE	FEMALE	TOTAL
20 - 24	-	34	34
25 - 29	-	8	8
30 - 34	-	2	2
35 - 39	-	1	1
40 - 44	-	-	-
45 - 49	-	-	-
50 - 54	-	-	-
55 - 59	-	-	-
60 - 64	-	-	-
65 and over	-	-	-
Unknown	-	-	-
Total	-	45	45

Source: Based on information received from the Manitoba Children's Dental Nurses Association.

TABLE VIII.4.3

FACTORS AFFECTING MANPOWER SUPPLY

DENTAL NURSES, MANITOBA

FACTOR	ASSUMPTION	SOURCE
Opening Stock	45	D.N.A.M., D.D.S.
Net Migration	0	D.N.A.M., D.D.S.
Net Immigration	0	D.N.A.M., D.D.S.
Net Occupational Shifts	-3 per year	D.N.A.M., D.D.S.
Training Output	0	D.N.A.M., D.D.S.
Active/Inactive	Calculated at 10% annually staff turnover	D.N.A.M., D.D.S.
Attrition	1981 age distribution retirement at 65	D.N.A.M., D.D.S.

Notes: D.N.A.M. is the Dental Nurses Association of Manitoba

D.D.S. is the Executive Director of Dental Services Division, Department of Health, Province of Manitoba

TABLE VIII.4.4 MANPOWER REQUIREMENTS
PROVINCE: MANITOBA
OCCUPATION: DENTAL NURSES

PROJECTED MANPOWER REQUIREMENTS											
YEAR	PROJECTED STOCK	POPULATION APPROACH 1:25105			CURRENT RATIO OF DENTAL NURSES TO ELIGIBLE PART.			SERVICE TARGET RATIO 1:850 OF ELIGIBLE PARTICIPANTS		
		LOW	MEDIUM	HIGH	LOW	MEDIUM*	HIGH	LOW	MEDIUM	HIGH
1981	42	42	42	42	42	42	42	84	84	85
	NET	0	0	0	0	0	0	42	42	43
1982	39	42	43	43	43	43	43	83	84	84
	NET	3	4	4	4	4	4	44	45	45
1983	36	43	43	43	43	43	43	83	84	84
	NET	7	7	7	7	7	7	47	48	48
1984	33	43	43	43	43	43	43	83	83	84
	NET	10	10	10	10	10	10	50	50	51
1985	30	43	43	44	43	43	43	83	83	84
	NET	13	13	14	13	13	13	53	53	54
1990	15	45	45	45	45	45	46	89	90	91
	NET	30	30	30	30	30	31	74	75	76
1995	0	46	46	47	46	46	47	94	95	97
	NET	46	46	47	46	46	47	94	95	97
2000	0	46	47	48	47	47	48	93	94	96
	NET	46	47	48	47	47	48	93	94	96

Note: The asterisked column (*) represents the most likely scenario for this occupation in Manitoba.

The age distribution is shown in Table VIII.4.2 and is based on information obtained from the Manitoba Children's Dental Nurses Assocation.

- Factors Affecting Manpower Supply

The assumptions made with respect to each of the factors which have the potential to affect manpower stock are shown in Table VIII.4.3, opposite. These factors include migration, immigration, occupational shifts, training output, active/inactive movements, and attrition. For each assumption, the information source has been identified.

- Estimating Requirements

  - Historical Ratio

    The current ratio of dental nurses to population, 1:25,105 was used to project the number of dental nurses required in the future to maintain the current level of manpower.

  - Service Target Ratio

    A ratio of 1 dental nurse to 850 population was used.

- Net Manpower Requirement

The net manpower requirements under each projection approach are shown in Table VIII.4.4, opposite. Currently, approximately 60,000 children in the age categories included by the Manitoba Children's Dental Program are not covered. This percentage was

assumed to remain constant. In addition, dentists provide services to approximately half of the remaining children.

Based on the most likely scenario of current utilization of dental nurses, there is an immediate requirement for additional dental nurses in the Children's Dental Program. This assumption is based on information from the Manitoba Government, who are currently reviewing the operation of this program.

If dental nurses were to be the only provider of basic dental care in this program, the province would require approximately double the number of dental nurses. This is illustrated in Table VIII.4.4, opposite.

APPENDIX III - SCOPE OF PRACTICE

DENTAL NURSES: CONTROL OF PRACTICE

PROVINCE	CERTIFICATION/LICENSING/REGISTRATION			TRAINING PROGRAM/ACCREDIATION		
	REQUIRED CHARACTERISTICS OF APPLICANTS	CERTIFICATION REQUIREMENTS	LICENSING REQUIREMENTS	LENGTH OF TRAINING & ADMISSION REQUIREMENTS	TRAINING LOCATION	EDUCATIONAL ACCREDITATION
Saskatchewan R.S.S. 1978 Chapter D-13	1. Evidence of good character	1. Evidence (certificate) signed by appropriate official of Department of Continuing Education of the Government of Saskatchewan of graduation as a dental nurse from a school for the education and training of dental nurses operated by the Department. 2. Evidence (certificate) signed by registar of any school for the education and training of dental nurses, and pass examinations conducted by School of Dental Nursing, Wascana Institute of Applied Arts and Science.	1. Must be actively employed for a cumulative period of two working months as a dental nurse in the immediate two year period prior to application for registration. 2. If not actively employed as a dental nurse for two years prior to application, must pass the examination conducted by the School of Dental Nursing, Wascana Institute of Applied Arts and Science. 3. If individual fails examination, must first complete refresher training prior to resitting examination.	1. 2 year program 2. Grade XII with two sciences (Physics, Chemistry or Biology) at Grade XII level, or Adult Education.	1. Wascana Institute of Applied Arts & Science, St. John Street Campus, Regina, Saskatchewan.	
British Columbia Not Licensed To Practice.						

con't.

PROVINCE	CERTIFICATION/LICENSING/REGISTRATION			TRAINING PROGRAM/ACCREDITATION		
	REQUIRED CHARACTERISTICS OF APPLICANTS	CERTIFICATION REQUIREMENTS	LICENSING REQUIREMENTS	LENGTH OF TRAINING & ADMISSION REQUIREMENTS	Training Location	EDUCATIONAL ACCREDITATION
Alberta Not Licensed To Practice						
Manitoba RM 1975 C.35 Cap. D.31	1. good character	1. certificate from a school for the education of dental nurses or equivalent. 2. If inactive for four years or more, must take refresher training			1. No formal training program in the province. 2. No existing training agreement.	

APPENDIX IV - BIBLIOGRAPHY

BIBLIOGRAPHY ON DENTAL NURSING

Saskatchewan Dental Plan Report, Department of Health, August, 1975, August 1976, August 1977.

Saskatchewan Health Dental Plan Annual Report. 1977 - 1978, 1978 - 1979, 1979 - 1980.

Saskatchewan Health Manpower Annual Report 1978, Saskatchewan Health, Wascana Institute - Calendar 1980 - 1981.

Gladstone, R.N. "International Dental Nurse Programs." Dental Hygiene, Volume 49, April, 1975.

Roder, D.M. "The Employment of Dental Nurses" Journal of Public Health Dentistry, Volume 38, No. 2, Spring, 1978.

Dunning, J.M., and N, "An International Look at School-Based Children's Dental Services." American Journal of Public Health, Volume 68, No. 7, July, 1978.

Lewis, M., "The Saskatchewan Dental Plan Revisited." Oral Health, Volume 68 No. 10, October 1978.

Keenan, G.W. "The Saskatchewan Dental Nurse: An Expanded Duty Auxiliary" Journal of Canadian Dental Association, No. 6, 1975.

Davey, K.W. "Delivering Dental Care in the Canadian North." Hospital Administration in Canada, March, 1975.

Overturf, J.R. "Too Few Patients? Count Your Auxiliaries." American Journal of Orthodontists, August, 1978.

Obuhoff, O.N. "Growth to Maximum Use of Auxiliaries. General Dentistry, March/April 1977.

Obuhoff, O.N. "Auxiliary Utilization: Increasing Productivity and How To Survive It." Transcript of Conference on Private Practice, Council of Dental Health, American Dental Association, July, 1974.

Comley, J.F., Steinberg, J.A. "Dental Auxiliaries-Changing Time = Changing Roles." Journal, Canadian Dental Association,November, 1978.

Association for Academic Health Centres, "Position on Dental Manpower and Expanded Function." Ohio Dental Journal, March, 1975.

Clemens, K.M. "The Battle Lines Are Drawn," Editorial, Journal of American Dental Association, January, 1976.

Thompson, G.W., et al, "The Ontario Dental Association Demonstration Project on Dental Auxiliaries With Expanded Duties." Ontario Dentist, Volume 52, No. 11, November, 1975.

Suggs, D.M.E., "Evaluating the Effectiveness of Dental Expanded Duty Personnel Utilization."

Sisty, N.L., et al, "Review of Training and Evaluation Studies in Expanded Functions for Dental Auxiliaries." Journal of American Dental Association, Volume 98, February, 1979.

Bezroukov, V., "Structure and Types of Dental Manpower," World Dental Health, W.H.O., Volume 29, No. 3.

Pelton, A.J., "Public Health Dental Auxiliary Training Program at The Pas, Manitoba," Journal of Canadian Dental Association, No. 6, 1975.

Forgay, M.G.E., "Educating the Dental Auxiliary: What Comes Next? A Personal View" Journal of Canadian Dental Association, No. 6, 1975.

Swanstorm, R.L. "The Effects of Preventive Dentistry and Treatment Productivity on Dental Health Manpower Needs," Northwest Dentistry, January/February, 1977.

Kaplis, N.A., Bentley, M., "Costs of Training EFDAS for a TEAM Program," Journal of Dental Education, Volume 43, No.5, 1979.

Barr, C.E., "Dental Assistant Utilization for Practising Dentists and Their Assistants."

Bischoff, R.J., Hartley, L.S., "Expanded Duty Dental Assistants - What are their Limitations?" Journal of Kentucky Dental Association, October, 1975.

Anderson, A.R., "The Dental Assistants" Journal of the New Jersey Dental Association, Summer, 1976.

Krauss, T.C. "The Basic Expanded Duty Dental Auxiliary" Journal of the Colorado Dental Association, September, 1975.

Keywood, O., "The Work of Dental Hygienists and Auxiliaries." Nursing Times, February 8, 1979.

Cohen, L.A., "Some Variables Affecting Dentists' Desire to use Expanded Duty Dental Auxiliaries," Journal of American Dental Association, Volume 97, December, 1978.

Dreuth, M., "The Dental Auxiliary - CLEP Examinations - One Year Later" The Dental Assistant, March/April, 1978.

Volz, F., "Dental Assisting Education in Community Colleges," The Dental Assistant, March/April, 1978.

Grift, H.C., "Utilization of Auxiliaries and Attitudes of Dentists Toward the Delegation of Duties." Journal of American Dental Association, Volume 93, December, 1976.

Jacods, R.M., "Reflections on the Controversy over Expanded Function Dental Auxiliaries." Journal of Dental Education, Volume, 40, No.3, 1976.

Franklin, D.R., "External Factors Leading to the Loss of Professional Control of the Delivery of Oral Health Care." Journal of the American College of Dentists, October, 1977.

Quartararo, I.N., "Auxiliaries - A Perspective" NYS Dental Journal, August/September, 1978.

Seidel, J.C., "Expanded Duty Needs Definition", February, 1977.

McLinn, H.M., "Living with Expanded Duty Functions in an Age of Dental Care "Transition"", Journal of the American Dental Association.

Waldman, H.B., "The Reaction of the Dental Profession to Changes in the 1970's" American Journal of Public Health, Volume 70, No. 6, June, 1980.

Schon, F., "The Working Concept of Modern Dentistry and Dental Team Work" Journal of the Dental Association of South Africa, January, 1975.

Slaughter, F.C., "Expanded Functions: An Honest Appraisal" Operative Dentistry, Volume 2, 1977.

Hamilton, A.I., "Expanded Duties: An Economic Fallacy" Editorial - Operative Dentistry, Volume 2, 1977.

MacFarlane, D.E., "Report to the Canadian Dental Association Council on Health Care" Oral Health, August, 1974.

Petrie, M.J., "Future of Non-Operating Dental Auxiliaries" Oral Health, August, 1974.

Roemer, R., "Credentialing Dental Auxiliary Personnel." The Dental Assistant, May, 1976.

Taylor, L.F., "The Use of Expanded - Duty Dental Auxiliaries" New Zealand Dental Journal, July, 1976.

Occhionero, R.L., "Auxiliary Programs - Their Impact on Expanded Functions Legislation' The Dental Assistant, September/October, 1978.

Koener, R.L., Duff, G. Hopkins, L.J., Kemp, W.J., "Legislating Auxiliary Utilization" The Dental Assistant, October, 1975.

Waldman, H.B., "Will Dentistry Eventually Make Use of Expanded Duties and Denturism" Dental Survey, November, 1976.

Butler, N.P., "An Analysis of the Titles and Job Specifications of Operating Dental Auxiliaries" Quintessence International, Volume 8, 1977.

D.H.E.W., "A Report to the President and Congress on the Status of Health Professions Personnel in the United States" United States Department of Health, Education and Welfare.

Health and Welfare Canada, "Dental Manpower/Population Ratio Estimates for Canada Under Four Situations" Health Manpower Report, No. 1 - 73.

Health and Welfare Canada, "Categories of Dental Auxiliaries in Canada by Province - 1973" Health Manpower Report No. 10 - 74.

Dunning, J.M. "Dental Care For Everyone", 1976.

Canadian Dental Association "Dental Health of Canadians, A Perspective" A Brief, March, 1980.

University of Alberta, "Report of Committee of Dental Services to Rural Areas" Senate, University of Alberta, 1976.

Rafferty, J., "Health Manpower and Productivity" 1974, Lexington Books.

"Health Manpower Provincial Report - Manitoba 1979" Research Section, Manitoba Department of Health.

Province of
British Columbia

Province of
Alberta

Province of
Saskatchewan

Province of
Manitoba

WESTERN CANADA
HEALTH MANPOWER TRAINING STUDY

Category # 2 - Report IX

PUBLIC HEALTH INSPECTOR

REPORT IX

PUBLIC HEALTH INSPECTION:

THE REQUIREMENT FOR ALTERNATIVE TRAINING AND FUNDING ARRANGEMENTS IN WESTERN CANADA

REPORT IX

PUBLIC HEALTH INSPECTION

THE REQUIREMENT FOR ALTERNATIVE TRAINING

AND FUNDING ARRANGEMENTS IN WESTERN CANADA

TABLE OF CONTENTS

PAGE

PREFACE

Study Background - General Introduction 1
Study Origins 1
Study Objectives 2
Study Timing 2
Occupation Definition 3

1. TRAINING NEEDS IN WESTERN CANADA

Introduction 4
Existing Training Programs 4
Occupational Issues 5

2. TRAINING RESPONSES

Decision Process 7
Timing and Location of Manpower Requirements 7
Indicated Training Responses 8
Defined Alternative Training Locations 9
Review of Funding Arrangements 10
Defined Length of Training Agreement 10

PAGE

3. TRAINING RECOMMENDATIONS 11

APPENDIX I - Study Approach and Methodology

APPENDIX II - Provincial Net Manpower Requirement

APPENDIX III - Scope of Practice

APPENDIX IV - Bibliography

PREFACE

Study Background - General Introduction

The provision of effective health services to the community is, to a considerable degree, dependent on three essential resources:

- an adequate supply of well trained specialist staff in each health occupation group
- the development of adequate facilities to service the community
- the availability of adequate funds to ensure cost effective and efficient health services.

The range and complexity of health treatment programs has expanded greatly in Canada during the last twenty-five years. In addition, changing technology and the development of new treatment programs have resulted in an increased requirement for skilled, adequately trained health manpower. These factors have resulted in an increased emphasis on manpower planning and skill training for health occupations to ensure an adequate supply of trained practitioners to meet defined manpower requirements.

Study Origins

The Western Canada Health Manpower Training Study was initiated by the Western Premiers at their annual conference in 1980. The study is under the direction of a Steering Committee comprised of government representatives from the Provinces of British Columbia, Alberta, Saskatchewan and Manitoba. The members of the Steering Committee represent both the Health and Education departments within each provincial government.

Study Objectives

The study terms of reference contain two major objectives. These are:

- to assess the existing and future needs for health manpower training programs and facilities in Western Canada

- to make recommendations for the rationalization of the location and funding of health manpower training programs and facilities in Western Canada.

Study Timing

The study consists of a review of 26 health occupations to be examined in five categories. The second category consists of four occupations, selected for the study on the basis of current availability of training programs in Western Canada. Although the study is divided into five categories for review, each occupation within these is to be studied independently over the next two years. Several of the occupations are inter-related. The requirement for one kind of manpower may be influenced by that of another, yet the two occupations may not be reviewed at the same time. Therefore, the study recommendations should be reviewed once all the occupations have been studied.

Occupation Definition

A public health inspector is defined as an individual who:

"enforces laws and regulations governing health standards and provides advice, performing any combination of the following duties; locate persons suspected of exposure to communicable diseases to prevent further spread of disease, interview exposed persons to secure information concerning other persons who may have been exposed. Advise people to obtain treatment. Inspect restaurants, hotels, cafeterias and other public places to ensure compliance with sanitation laws. Take samples of litter, food and air and orders chemical, physical or biological tests to determine contamination. Visit plants where food, drugs, cosmetics and similar items are manufactured to investigate sanitary conditions and health and hygiene habits of persons handling consumer products. Destroy sub-grades or prohibit sales of impure, toxic, damaged or misbranded items. Ascertain that required permits have been obtained and are displayed. Inspect nursing homes and hospitals to ensure conformance with standards and laws governing sanitation, facilities, ethical practices, maintenance of records and competence of personnel. Recommend changes in administrative procedures, facilities and standards to improve efficiency and service to patients. Apply regulations governing manufacture, labelling, and sale of upholstered and stuffed articles to ensure use of approved materials. Inspect waste disposal sites to ensure that pollution control regulations are followed. Inspect water wells to enforce provision."[1]

The public health inspector is typically viewed as the generalist of a public health team, providing expertise in human relations as well as technical matters. The public health inspector is required to conduct environmental health programs and to interpret, advise upon, and to enforce regulations made under The Public Health Act.

1. Canadian Classification and Dictionary of Occupations, No. 1116, 1980 Revision.

EXHIBIT 1

MANPOWER REQUIREMENTS

WESTERN CANADA, PUBLIC HEALTH INSPECTION

(BASED ON MOST LIKELY SCENARIO FROM EACH PROVINCE)

YEAR	PROJECTED STOCK	PROJECTED REQUIREMENT
1981	460	600
	NET	140
1982	466	613
	NET	147
1983	473	628
	NET	155
1984	476	641
	NET	165
1985	479	655
	NET	176
1990	508	717
	NET	209
1995	512	774
	NET	262
2000	539	827
	NET	288

1.0 TRAINING NEEDS IN WESTERN CANADA

1.1 Introduction

Exhibit 1, opposite, shows the projected stock and requirement for public health inspectors during the period 1981 - 2000. These projections are based on the most likely scenario derived for each province, and show an average annual requirement of 15 additional practitioners throughout the forecast period.

For each province, the most likely scenario has been based on the medium population projection, and service target information. For the Provinces of British Columbia, Alberta and Manitoba, a service target ratio of 1:12,000 has been used, whereas a ratio of 1:9,000 has been used for the Province of Saskatchewan. With the exception of Manitoba, the other three western Provinces are currently initiating the development of time measurement systems in order to more adequately ascertain the level of resources required to meet their legislated mandate. To a large extent, this has been due to a recent trend for government agencies to adopt modified versions of program planning and resource allocation systems. To date, however, reliable utilization data and time estimates are not readily available from these systems currently under development. In the absence of such utilization information, preliminary time estimates were used to develop ideal levels of staffing. Given the current trend toward constraint in government expenditure, however, these ideal levels of service may not necessarily be indicative of future development. The service target ratios used in this study were chosen to reflect ideal levels of service subject to likely funding levels by government. It must be emphasized that the future requirement for public health inspectors in Western Canada is largely dependent on the availability and level of government budgetary allocations.

1.2 Existing Training Programs

The British Columbia Institute of Technology is currently the only

training program in western Canada for public health inspectors. First year intake in the two year certificate program is set at 40 students, with bursaries being granted by the Provinces of Alberta and Saskatchewan. Ryerson Polytechnical Institute in Toronto, Ontario, is the other major school for public health inspectors in Canada. Ryerson also offers a two year certificate program similar to that offered by B.C.I.T., and has recently introduced a four year degree program. For a more detailed discussion of these training programs, please refer to Report 2 - A, "The Scope of Existing Training Programs Category II Occupations."

1.3 Occupational Issues

Recent years have seen the emergence of two trends which are having a significant impact on the role of the public health inspector. The increased body of knowledge concerning environmental health has served to highlight the many complex problems and interactions which have arisen from the heavy industrialization experienced in this century. Communicable diseases, while not completely eradicated, are now being challenged by pollution in its many forms, and a wide array of occupation-related health problems. The effort devoted to study these complex issues has resulted in the rise of many specialist occupations, which are gradually assuming some of the functions previously performed by the public health inspector. Secondly, partly as a result of this increased specialization, government has delegated organizational responsibility for these specialist functions to a variety of administrative arms. Typically, provincial Departments of Labour and Agriculture have assumed responsibility for functions previously considered to be part of the department responsible for public health. This has tended to diminish the role of the public health inspector and, from the perspective of that group, led to fragmentation and overlapping of services.

To counteract these trends, the public health inspection profession sees the need for increased training to better equip themselves in coping with the broader aspects of environmental health. The implementation of the degree program at Ryerson Polytechnical Institute in Toronto, Ontario, and the design of additional degree programs at other institutions, is viewed as a significant step by members of the profession. This educational trend could potentially result in the development of a two-tier system of public health, with the degree graduate dealing with the more complex environmental issues and the public health technician dealing with routine inspections and other technical aspects of the function.

Indications are that the public health profession, in the United States of America and the United Kingdom, faced a similar transition point during the past 10-15 years with respect to educational enhancement. Currently, a three-tier system for public health professionals exists in the United States. The entry level incumbent, referred to as a health technologist or associate sanitarian, is typically a graduate of a two year certificate-level program, and is responsible for the bulk of the field work performed. The first-level supervisory group in this three-level system, whose members are referred to as sanitarians, typically holds a baccalaureate-level degree, and the higher level managerial group typically holds a graduate level degree. For these two latter groups, a number of years of experience is required in addition to the formal educational requirements. From the perspective of training strategies in western Canada, the experience in the United States raises the potential for a two-level training approach, with a two year certificate requirement for those people entering the field, and upgrading provided to practitioners who have had a number of years of experience and have potential for further advancement in the public health profession.

EXHIBIT 2

NET MANPOWER REQUIREMENTS

MOST LIKELY SCENARIO

OCCUPATION: PUBLIC HEALTH INSPECTION

YEAR	BRITISH COLUMBIA		ALBERTA		SASKATCHEWAN		MANITOBA		REGION	
	STOCK	REQUIREMENT	STOCK	REQUIREMENT	STOCK	REQUIREMENT	STOCK	REQUIREMENT	STOCK	REQUIREMENT
1981	189	223	133	180	73	109	65	88	460	600
NET		34		47		36		23		140
1982	192	228	138	186	72	110	64	89	466	613
NET		36		48		38		25		147
1983	196	232	143	194	72	112	62	90	473	628
NET		36		51		40		28		155
1984	200	237	149	201	68	113	59	90	476	641
NET		37		52		45		31		165
1985	201	242	154	207	67	115	57	91	479	655
NET		41		53		48		34		176
1990	220	264	181	236	58	123	49	94	508	717
NET		44		55		65		45		209
1995	232	285	194	263	48	130	38	96	512	774
NET		53		69		82		58		262
2000	242	303	221	290	44	136	32	98	539	827
NET		61		69		92		66		288

Note: Most Likely Scenario

Service Target Ratio

- British Columbia, Alberta, Manitoba, 1:12,000
- Saskatchewan 1:9,000
- Medium population scenario

2.0 TRAINING RESPONSES

2.1 Decision Process

The decision process, outlined in Appendix IV, and discussed in detail in Report C, "A Decision Process To Evaluate the Location of, and Funding Arrangements for Health Occupation Training Programs in Western Canada", was used to evaluate the training implications of the net manpower requirements for public health inspectors discussed in Section 1.1, above. This section contains the results of this analysis.

2.2 Timing and Location of Manpower Requirement

Exhibit 2, opposite, shows the projected manpower requirement for the period 1981 - 2000 for each of the provinces under the most likely scenario. As the exhibit indicates, there is an immediate requirement in each of the provinces, with Saskatchewan showing the largest requirement. For each of the provinces excluding Saskatchewan, there is an additional annual requirement for approximately 6 to 7 practitioners, and 9 - 10 additional practitioners for the Province of Saskatchewan. Based on the assumption that the additional manpower required would initially occupy entry level positions,there is a need for introductory skills training for approximately 300 public health inspectors during the 20 year period. If it is further assumed that, as discussed in Section 1.3, above, that a two-tiered system is adopted with an approximate span of control of 1:5, then there is a requirement for upgrading training for approximately 140 experienced supervisors during the next two decades. Based on a ratio of 2.5 candidates for every graduate supervisory position, this would result in a requirement for approximately 350 baccalaureate-level graduate public health inspectors over the twenty year period.

2.3 Indicated Training Responses

The preceding discussion indicates the need for two different types of training responses, introductory and upgrading skill training. Each of these is discussed in more detail below.

- Introductory training - The two year certificate program at B.C.I.T. has an average annual intake of 40 students per year, of which approximately 25 - 30 graduate from the second year of the program. The four western provinces indicate that they are employing approximately 16 - 18 of this graduating class. The current attrition rate from the program may be due, in part, to the current unavailability of employment opportunities for these graduates. Based on the assumption that the public health inspection programs will be funded to the levels indicated by the selected service targets, the B.C.I.T. program, without expansion, could adequately address the additional manpower requirement in Western Canada during the forecast period.

- Upgrading programs - Based on the assumption that baccalaureate level degrees would be required for supervisory positions in public health, there is a need to initiate a formal upgrading mechanism. The objective of such a program would be to provide an opportunity for a widely dispersed labour force to gain access to training facilities while continuing their employment. It would seem unrealistic to assume that high potential practitioners would be in any position to withdraw from the active labour force for a period of two years to return to full-time study. The need, therefore, is for an outreach capacity in the upgrading program.

2.4 Defined Alternative Locations

The range of alternative locations to provide the additional training needed for public health inspectors is dependent on the type of training to be provided. The current program at B.C.I.T. has the potential to provide the introductory training to the additional manpower required during the next 20 years. There is no justification for an additional introductory level program in western Canada, nor any support to move the current program from B.C.I.T. to any other location in western Canada. The disruptive nature of such a move, not to mention the financial implications, would mitigate against such a consideration.

As discussed above, the major criteria in evaluating alternative locations for the provision of upgrading skills training is the availability of an appropriate delivery mechanism. Alternative delivery systems, in the form of correspondence training or outreach audio-visual or satelite training, represent potentially the most beneficial forms for this training.

It has been indicated that a ministerial committee is currently investigating the future role of B.C.I.T. in the post-secondary education system in British Columbia. If it were recommended that this institution be given degree granting status, then it would be the most logical location for a degree program in public health inspection for two reasons. Firstly, the faculty expertise needed to develop and deliver an upgrading program is resident at B.C.I.T., as well as an advisory committee composed of the major employers of this occupational group. Secondly, B.C.I.T. meets the criteria of having outreach capabilities necessary to deliver the proposed program.

Still another alternative site for this bacclaureate-level program is the University of Victoria. As indicated in Report 2-A, "The Scope of Existing Training Programs, Category II Occupations," preliminary discussions have taken place between this institution and the B.C. Chapter, Canadian Institute of Public Health Inspectors. Curriculum

development has been initiated, with the concept of outreach capabilities guiding this development. Dependent on the outcome of the B.C.I.T. review, the University of Victoria represents a viable alternative because of its physical proximity to the expertise of B.C.I.T.

2.5 Review of Funding Arrangements

- Introductory training - Based on the assumption that the two year certificate program at B.C.I.T. assumes the status of the Western Canada School for Public Health Inspection, the three western provinces, other than British Columbia, should enter bilateral training agreements with the Government of British Columbia. Specifically, Alberta should contract 11 training places annually, with Saskatchewan to contract for 9 places and Manitoba 7 places, respectively. Each of these provinces should share in the ongoing operational and administrative overhead costs of the program based on the proportion of training places for which each contracts. Program development, start-up and capital costs would be excluded from these training agreements on the basis that a program is already in existence. Additionally, British Columbia should secure 10 places annually.

- Upgrading skills - Currently, there is no program in western Canada which provides upgrading training for public health inspectors. The four western provinces should enter a formal training agreement which would provide for the development and operation of such a program.

2.6 Defined Length of Training Agreement

For both the introductory skills and the upgrading training programs, the formal training agreements between the provinces of Alberta, Saskatchewan and Manitoba with the Government of British Columbia should initially be of five years duration, with subsequent renewal options for additional five year periods.

3.0 RECOMMENDATIONS

- That the British Columbia Institute of Technology be designated the western Canada school responsible for certificate level public health inspection education.

- That the intake of students into the two year certificate program at B.C.I.T. not be increased.

- That Alberta contract for 11 training places annually, Saskatchewan 9 training places annually, Manitoba 7 places annually and British Columbia secure 10 places per year in the two year certificate program.

- That each province share in the ongoing operational and administrative overhead costs of the two year certificate program based on the proportion of training places allocated to each province (British Columbia 27.1%, Alberta 29.7%, Saskatchewan 24.3%, and Manitoba 18.9%).

- That formal bilateral training agreements for the certificate program be negotiated between British Columbia and the other western provinces for an initial period of five years duration with subsequent renewal options for additional five year periods.

- That one four year degree program in public health be developed for western Canada, with an annual intake of approximately 20 students, and that this program should provide an option for either a four year degree, or alternatively a two year program to upgrade certificate level to degree level.

- That the degree program be located in an institution with health science degree granting status located in either British Columbia or Alberta.

- That formal bilateral training agreements for the degree program be negotiated between British Columbia and the other western provinces for an initial period of five years, with subsequent renewal options for additional five year periods.

- That Alberta contract for 6 training places annually, Saskatchewan 4 places annually, Manitoba 3 places annually, and British Columbia secure 6 places per year in the degree program.

- That program costs in the degree program be based on the proportion of training places allocated to each province (British Columbia 36.6%, Alberta 35.1%, Saskatchewan 16.4%, and Manitoba 11.9%).

- That the training delivery mechanism for the degree program make use of audio-visual and satelite capabilities to provide access by practitioners in field locations in the four western provinces.

APPENDIX I

STUDY APPROACH AND METHODOLOGY

STUDY APPROACH

Introduction

In order to achieve the study objectives, the work program consists of three key activities. These are:

- the analysis of manpower supply and requirements, and the calculation of net manpower requirements
- the analysis of existing training programs for Western Canada
- the development of recommendations for alternative training locations and funding arrangements

Analysis of Manpower Supply and Requirements

The analysis of manpower supply and requirements is designed to allow for a variety of data inputs, and for different emphasis depending on the occupation under review. A variety of data sources are used including provincial and national associations, health insurance agencies, and provincial health and education departments. In all instances, data is developed independently of previously published sources.

In addition to the basic projection of net manpower requirements, a number of sensitivity analyses have been completed to assess the impact of changed in the factors affecting supply and requirements, prior to developing recommendations for either additional training programs, or expanding existing training programs.

Approaches to Determining Manpower Requirements

The approach developed to determine manpower requirements uses three methods of projection. These are discussed below.

1. Service Utilization Approach

The utilization approach is based on an analysis of the pattern of health service usage. It establishes trends in service utilization and projects these onto future population estimates. There are three steps in the service utilization approach.

Step 1 - Determine Per Capita Utilization Rate

Historical data of the number of services provided, by age and sex of recipient is derived. The number of services per age/sex group is then divided by the population for group in the corresponding year. This results in a per capita utilization rate.

Step 2 - Project Future Service Required

The per capita utilization rate is projected onto the low, medium and high population for each year from 1981 to 2000. This results in an estimate of total future services.

Step 3 - Estimated Number of Practitioners Required

Having determined the total future services, the model projects the number of practitioners required, by assuming a constant level of services per practitioner. The number of services per practitioner is determined by dividing total services by the number of practitioners in the base year. To estimate the required number of practitioners, the model divides total future services required by the number of services per practitioner.

2. Service Target Ratio Approach

Service target ratios reflect a theorectical optimal manpower level required to meet health service requirements in the occupation under review. They are expressed as the ratio of practitioner to population. The service target ratios are derived based on discussion with health authorities, review of published reports, articles and summary of defined health care needs.

3. Population Ratio Approach

Population ratios are derived by dividing the total population at a specific point in time by the number of active practitioners. This results in a ratio of practitioners to population.

These ratios are analysed to determine if any trends exists. To project futuren manpower requirements, the model divides total projected population by the previously determined population ratio.

Summary of Approaches to Projecting Manpower Requirements

The three approaches outlined above have been used for the calculation of manpower requirements for this occupation. The specific application of each approach to this occupation is discussed under General Assumption, Appendix II, following.

Development of Recommendations for Alternative Training Locations and Funding Arrangements

We have developed a decision process to assist in developing recommendations for alternative training location(s) and funding arrangements. This process is designed to allow for the logical, consistent evaluation of a range of training alternatives.

There are seven steps in the decision process:

- Step 1. Analysis of manpower requirements
- Step 2. Identification of the appropriate type(s) of training
- Step 3. Definition of alternative training locations
- Step 4. Evaluation of alternative locations for new programs
- Step 5. Establishment of timing of training program requirement
- Step 6. Recommendation on training action(s) and location(s)
- Step 7. Recommendation on funding alternative(s)

APPENDIX II

PROVINCIAL NET MANPOWER REQUIREMENTS

TABLE IX.0.1

TOTAL NUMBER OF PUBLC HEALTH INSPECTORS IN WESTERN CANADA

YEAR	BRITISH COLUMBIA[1]	ALBERTA[2]	SASKATCHEWAN[3]	MANITOBA[4]
1973	-	-	-	73
1974	-	-	-	81
1975	-	-	-	81
1976	-	-	68	80
1977	176	86	75	78
1978	-	86	79	81
1979	189	96	79	64
1980	184	129	80	66

Notes:
1. Roll Call 79:1977, 1979; B.C. C.I.P.H.I.:1980
2. Health and Social Services Manpower In Alberta 1979 (based on data from Alberta C.I.P.H.I.) and 1980 information obtained from Director, Environmental Health Services
3. Saskatchewan Health Manpower Annual Report, 1978 P.M.P. Survey for 1979 and 1980
4. Health Manpower Provincial Report, Manitoba 1974 for 19 1973 - 1979, Manitoba C.I.P.H.I. for 1980.

TABLE IX.0.2

FACTORS AFFECTING MANPOWER SUPPLY

PUBLIC HEALTH INSPECTORS, WESTERN CANADA

FACTOR	BRITISH COLUMBIA	ALBERTA	SASKATCHEWAN	MANITOBA
Opening Stock	184	129	73	66
Net Migration	1 every 2nd year	1/year	-2 per year	-2/year
Net Immigration	0	0	0	0
Net Occupational Shifts	0	-1 every 2nd year	-1 every year	-1 every year
Training Output	5 per year	6/year	3 per year	2
Active/Inactive Flows	0	0	0	0
Attrition	1981 Age distribution retirement at 65	1981 Age distribution retirement at 65	1981 Age distribution retirement at 65	1981 Age distribution retirement at 65

TABLE IX.0.3

AGE STRUCTURE OF PUBLIC HEALTH INSPECTORS

BY PROVINCE AND REGION

AGE GROUP	BRITISH COLUMBIA	ALBERTA	SASKATCHEWAN	MANITOBA	TOTAL #	TOTAL %
24 or less	7	39	11	3	60	13.2
25 - 29	24	26	14	4	68	15.0
30 - 34	47	9	9	13	78	17.4
35 - 39	27	4	5	11	47	10.4
40 - 44	9	8	5	7	29	6.4
45 - 49	8	6	1	1	16	3.5
50 - 54	21	19	11	4	55	12.2
55 - 59	9	6	8	2	25	5.5
60 - 64	11	7	9	3	30	6.6
65 & over	-	-	-	-	-	-
Unknown	21	5	-	18	44	9.8
Total	184	129	73	66	452	100.0

GENERAL ASSUMPTIONS

Manpower Stock

Table IX.0.1, opposite, contains the total number of public health inspectors registered in Western Canada. It contains those practitioners who are active in their respective provinces as identified by the sources noted at the bottom of the table.

Factors Affecting Manpower Supply

The assumptions made with respect to each of the factors which have the potential to affect manpower stock are shown opposite in Table IX.0.2. These factors include migration, immigration, occupational shifts, training output, active/inactive movements, and attrition. For each assumption, the information source has been identified. The age distribution of practitioners is shown in Table IX.0.3.

Estimating Requirements

- Historical Ratio

  For each province, the current ratio of public health inspectors to population was used to project the number of practitioners required in the future to maintain the current level of manpower.

- Utilization

  Because services are not delivered on a personal basis, the per capita service utilization approach was not used for this study.

- Service Target Ratio

The Public Health Inspection Services, Saskatchewan Health, has recently developed a time management and analysis system to monitor public health services, and to develop a data base for resource planning and allocation. Although this system has been in place for approximately six months, no stable trend information is currently available. However, in developing this system, time estimates were developed for various activities, and these estimates have been used to identify service targets for the range of public health services provided in Saskatchewan. For the other western provinces, the range of services provided in each province was compared to those in Saskatchewan, and adjustments to service targets were made to reflect those differences.

Sensitivity Analysis

Because of the unavailability of utilization information from the provinces, no sensitivity analysis was undertaken.

TABLE IX.1.1

NUMBER OF PUBLIC HEALTH INSPECTORS

IN BRITISH COLUMBIA, 1977, 1979, 1980

YEAR	ROLL CALL 79	B.C. CHAPTER, CANADIAN INSTITUTE OF PUBLIC HEALTH INSPECTORS
1977	176	
1978	-	
1979	189	
1980		184

TABLE IX.1.2

TOTAL NUMBER OF ACTIVE PUBLIC HEALTH INSPECTORS,

IN BRITISH COLUMBIA, BY AGE

AGE GROUP	MALE	FEMALE	UNKNOWN	TOTAL
20 - 24	2	5		7
25 - 29	18	6		24
30 - 34	38	9		47
35 - 39	26	1		27
40 - 44	8	-	1	9
45 - 49	8	-		8
50 - 54	21	-		21
55 - 59	9	-		9
60 - 64	10	-	1	11
65 and over	-	-		-
Unknown	15	2	4	21
Total	155	23	6	184

Source: Canadian Institute of Public Health Inspectors, (C.I.P.H.I.) supplemented by information obtained from President, British Columbia Chaper, C.I.P.H.I.

PROVINCIAL ASSUMPTIONS

BRITISH COLUMBIA

a) Legal Controls

Under the Health Act (RS Chapter 169, 1979), the Lieutenant Governor in Council may make regulations for the prevention, treatment, mitigation and suppression of disease, and defines the scope of activities and regulations to accomplish this goal.

The certification and licensing requirements are shown in Appendix 2 - Scope and Control of Practice.

b) Insured Services

There are no insured services for this occupation, since public health inspectors do not provide services directly to individuals in the population.

c) Assumptions

- Manpower Stock

  Table IX.1.1, opposite, contains the total number of public health inspectors registered in British Columbia. The 1980 figure excludes those practitioners who are working in other occupations, or otherwise not practising as public health inspectors. The age distribution of practitioners is shown in Table IX.1.2.

TABLE IX.1.3

FACTORS AFFECTING MANPOWER SUPPLY

PUBLIC HEALTH INSPECTORS, BRITISH COLUMBIA

FACTOR	ASSUMPTION	SOURCE
Opening Stock	184	C.I.P.H.I.
Net Migration	1 every 2 years	C.I.P.H.I.
Net Immigration	0	C.I.P.H.I.
Net Occupational Shifts	0	C.I.P.H.I.
Training Output	5 per year 1981-2000	C.I.P.H.I.
Active/Inactive	0	C.I.P.H.I.
Attrition	Current age distribution and assuming retirement at age 65	

Note: British Columbia Chapter, Canadian Institute of Public Health Inspectors

- Factors Affecting Manpower Supply

The assumption made with respect to each of the factors which have the potential to affect manpower stock are shown in Table IX.1.3, opposite. These factors include migration, immigration, occupational shifts, training output, active/inactive movements, and attrition. For each assumption, the information source has been identified.

- Estimating Requirements

  - Historical Ratio

The current ratio of public health inspectors to population, 1:14,179, was used to project the number of public health inspectors required in the future to maintain the current level of manpower.

  - Service Target Ratio

Service target ratios of 1:9,000 and 1:12,000 were used, based on the range of services, and on the ideal estimates derived from the time analysis system in the province of Saskatchewan. The range of services in British Columbia appear to be compatible with the services provided in the province of Saskatchewan.

TABLE IX.1.4 MANPOWER REQUIREMENTS

PROVINCE: BRITISH COLUMBIA

OCCUPATION: PUBLIC HEALTH INSPECTION

PROJECTED MANPOWER REQUIREMENTS										
YEAR	PROJECTED STOCK	POPULATION APPROACH 1:14179			SERVICE TARGET* 1:12000			SERVICE TARGET 1:9000		
		LOW	MEDIUM	HIGH	LOW	MEDIUM*	HIGH	LOW	MEDIUM	HIGH
1981	189	188	189	191	221	223	225	294	297	300
	NET	-1	0	2	32	34	36	105	108	111
1982	192	191	192	195	225	228	230	299	303	306
	NET	-1	0	3	33	36	38	107	111	114
1983	196	194	196	200	229	232	235	304	309	313
	NET	-2	0	4	33	36	39	108	113	117
1984	200	197	200	204	232	237	240	309	316	320
	NET	-3	0	4	32	37	40	109	116	120
1985	201	200	204	209	236	242	246	314	222	327
	NET	-1	3	8	35	41	45	113	121	126
1990	220	215	223	231	253	264	272	337	352	362
	NET	-5	3	11	33	44	52	117	132	142
1995	232	228	241	251	269	285	296	358	379	394
	NET	-4	9	19	37	53	64	126	147	162
2000	242	239	256	270	282	303	318	375	403	423
	NET	-3	14	28	40	61	76	133	161	181

Note: The asterisked column (*) represents the most likely scenario for this occupation in British Columbia.

- Net Manpower Requirements

The net manpower requirements under each projection approach are shown in Table IX.1.4, opposite. The most likely scenario is based on a service target ratio of 1:12,000 under the medium population projection. On the basis of this analysis, there is a projected requirement for additional practitioners immediately.

TABLE IX.2.1

NUMBER OF PUBLIC HEALTH INSPECTORS

IN ALBERTA, 1977 TO 1980

YEAR	HEALTH AND SOCIAL SERVICE MANPOWER IN ALBERTA 1979	DIRECTOR ENVIRONMENTAL HEALTH SERVICES, GOVERNMENT OF ALBERTA	CANADIAN INSTITUTE OF PUBLIC HEALTH INSPECTORS
1977	86		
1978	86		
1979	96		
1980		129	93

TABLE IX.2.2

TOTAL NUMBER OF ACTIVE PUBLIC HEALTH INSPECTORS, IN ALBERTA, BY AGE

AGE GROUP	MALE	FEMALE	TOTAL
20 - 24	39	-	39
25 - 29	25	1	26
30 - 34	8	1	9
35 - 39	3	1	4
40 - 44	7	1	8
45 - 49	5	1	6
50 - 54	19	-	19
55 - 59	6	-	6
60 - 64	7	-	7
65 and over	-	-	-
Unknown	5	-	5
Total	124	5	129

Source: Age distribution provided by Director, Environmental Health Services, Department of Social Services and Community Health, Province of Alberta. The count includes the four practitioners known to be working independently as industry consultants.

ALBERTA

a) Legal Controls

In the Public Health Act (CH 294, R.S. 1970), the Provincial Board of Health, subject to the approval of the Lieutenant Governor in Council, makes and issues orders, rules and regulations for the protection and improvement of health.

The certification and licensing requirements are shown in Appendix 2 - Scope and Control and Practice.

b) Insured Services

There are no insured services for this occupation, since public health inspectors do not provide services directly to individuals in the population.

c) Assumptions

- Manpower Stock

  Table IX.2.1, opposite, contains the total number of public health inspectors registered in Alberta.

  The manpower count used for projections is the 1980 estimate of 129 practitioners. This includes those public health inspectors currently funded by the Province of Alberta in the Health Units throughout Alberta, the five federal government employees, and the four public health inspectors known to be in private practice. The age distribution is shown in Table IX.2.2.

TABLE IX.2.3

FACTORS AFFECTING MANPOWER SUPPLY

PUBLIC HEALTH INSPECTORS, ALBERTA

FACTOR	ASSUMPTION	SOURCE
Opening Stock	129	Director, Environmental Health Services Government of Alberta
Net Migration	1 each year	C.I.P.H.I.
Net Immigration	0	Director, Environmental Health Services
Net Occupational Shifts	Loss of 1 every second year	P.M.P. Survey Director, Environmental Health Services
Training Output	6 per year	Director, Environmental Health Services
Active/Inactive	0	Director, Environmental Health Services
Attrition	Based on current age distribution, assuming retirement at age 65	

. Factors Affecting Manpower Supply

The assumptions made with respect to each of the factors which have the potential to affect manpower stock are shown in Table IX.2.3, opposite. These factors include migration, immigration, occupational shifts, training output, active/inactive movements, and attrition. For each assumption, the information source has been identified.

. Estimating Requirements

. Historical Ratio

The current ratio of public health inspectors to population, 1:16,141, was used to project the number of public health inspectors required in the future to maintain the current level of manpower.

. Service Target Ratio

Service target ratios of 1:9,000 and 1:12,000 were used based on the range of services, and on the ideal estimates derived from the time analysis system in the province of Saskatchewan. The range of services provided in Alberta are more limited than those in Saskatchewan, and allowance has been made to reflect these differences.

TABLE IX.2.4 MANPOWER REQUIREMENTS

PROVINCE: ALBERTA

OCCUPATION: PUBLIC HEALTH INSPECTION

PROJECTED MANPOWER REQUIREMENTS										
YEAR	PROJECTED STOCK	POPULATION APPROACH 1:14179			SERVICE TARGET 1:9,000			SERVICE TARGET* 1:12,000		
		LOW	MEDIUM	HIGH	LOW	MEDIUM	HIGH	LOW	MEDIUM*	HIGH
1981	133	132	134	135	236	239	241	177	180	181
	NET	-1	1	2	103	106	108	44	47	48
1982	138	135	139	139	242	249	250	182	186	187
	NET	-3	1	1	104	111	112	44	48	49
1983	143	138	144	144	248	258	258	186	194	194
	NET	-5	1	1	105	115	115	43	51	51
1984	149	142	149	149	254	268	268	190	201	201
	NET	-7	0	0	105	119	119	41	52	52
1985	154	145	154	154	259	276	277	195	207	207
	NET	-9	0	0	105	122	123	41	53	53
1990	181	159	175	181	285	314	325	214	236	244
	NET	-22	-6	0	104	133	144	33	55	63
1995	194	172	196	208	308	351	374	231	263	280
	NET	-22	2	14	114	157	180	37	69	86
2000	221	184	216	236	329	387	423	247	290	317
	NET	-37	-5	15	108	166	202	26	69	96

Note: The asterisked column (*) represents the most likely scenario for this occupation in Alberta.

. Net Manpower Requirements

Table IX.2.4, opposite, shows the projected manpower requirements under each projection approach. The most likely scenario is based on a service target ratio of 1:12,000 under the medium population projection. There is an immediate requirement for an additional 47 public health inspectors, and for a total of 69 additional practitioners by the year 2000.

TABLE IX.3.1

NUMBER OF PUBLIC HEALTH INSPECTORS

IN SASKATCHEWAN, 1976 TO 1980

YEAR	SASKATCHEWAN HEALTH MANPOWER ANNUAL REPORT (1978)	P.M.P. SURVEY[1]
1976	68	-
1977	75	-
1978	79	-
1979	-	79
1980	-	80

Note: P.M.P. Survey of:

- Saskatchewan Health
- Health and Welfare Canada
- Department of Northern Saskatchewan
- Regina City Health Department
- Saskatoon City Health Department

TABLE IX.3.2

TOTAL NUMBER OF ACTIVE PUBLIC HEALTH INSPECTORS, SASKATCHEWAN, BY AGE, 1981

AGE GROUP	MALE	FEMALE	TOTAL
20 - 24	7	4	11
25 - 29	12	2	14
30 - 34	8	1	9
35 - 39	5	-	5
40 - 44	5	-	5
45 - 49	1	-	1
50 - 54	11	-	11
55 - 59	8	-	8
60 - 64	9	-	9
65 and over	-	-	-
Unknown	-	-	-
Total	66	7	73

Source: P.M.P. Survey of:

- Saskatchewan Health
- Health and Welfare Canada
- Department of Northern Saskatchewan
- Regina City Health Department
- Saskatoon City Health Department

TABLE IX.3.3

FACTORS AFFECTING MANPOWER SUPPLY

PUBLIC HEALTH INSPECTORS, SASKATCHEWAN

FACTOR	ASSUMPTION	SOURCE
Opening Stock	73	P.M.P. Survey
Net Migration	-2	P.M.P. Survey
Net Immigration	0	P.M.P. Survey
Net Occupational Shifts	-1	P.M.P. Survey
Training Output	3 per year 1981-2000	P.M.P. Survey
Active/Inactive Attrition	0 1981 Age Distribution retirement at 65	P.M.P. Survey

Note: P.M.P. Survey of:

- Saskatchewan Health
- Health and Welfare Canada
- Department of Northern Saskatchewan
- Regina City Health Department
- Saskatoon City Health Department

SASKATCHEWAN

a) Legal Controls

The Public Health Act provides for the safeguarding of public health and safety endangered by communicable disease, contaminants, physical, chemical and biological hazards. Under the Act, the Lieutenant Governor in Council may make regulations specific to the provision of inspection services.

The certification and licensing requirements are shown in Appendix 2 - Scope and Control of Practice.

b) Insured Services

There are no insured services for this occupation, since public health inspectors do not provide services directly to individuals in the population.

c) Assumptions

- Manpower Stock

Table IX.3.1, opposite, contains the total number of public health inspectors registered in Saskatchewan. The count is based on a survey of major employers in the province, and indicates the total number of approved positions. The age distribution of practitioners is shown in Table IX.3.2, opposite, and the number 73 relates to those actually employed at March, 1981.

Factors Affecting Manpower Supply

The assumptions made with respect to each of the factors which have the potential to affect manpower stock are shown in Table IX.3.3, opposite. These factors include migration,

TABLE IX.3.4 MANPOWER REQUIREMENTS

PROVINCE: SASKATCHEWAN

OCCUPATION: PUBLIC HEALTH INSPECTION

PROJECTED MANPOWER REQUIREMENTS										
YEAR	PROJECTED STOCK	POPULATION APPROACH 1:12060			SERVICE TARGET* 1:9000			SERVICE TARGET 1:6000		
		LOW	MEDIUM	HIGH	LOW	MEDIUM*	HIGH	LOW	MEDIUM	HIGH
1981	73	81	81	83	108	109	112	162	163	168
	NET	8	8	10	35	36	39	89	90	95
1982	72	82	82	85	109	110	114	164	165	171
	NET	10	10	13	37	38	42	92	93	99
1983	72	82	83	87	110	112	116	166	168	174
	NET	10	11	15	38	40	44	94	96	102
1984	68	83	85	88	111	113	118	167	170	178
	NET	15	17	20	43	45	50	99	102	110
1985	67	84	86	90	113	115	121	169	173	181
	NET	17	19	23	46	48	54	102	106	114
1990	58	87	92	99	117	123	133	176	184	200
	NET	29	34	41	59	65	75	118	126	142
1995	48	90	97	109	121	130	145	181	195	218
	NET	42	49	61	73	82	97	133	147	170
2000	44	92	102	116	123	136	158	184	205	237
	NET	48	58	74	79	92	114	140	161	193

Note: The asterisked column (*) represents the most likely scenario for the occupation in Saskatchewan.

- immigration, occupational shifts, training output, active/inactive movements, and attrition. For each assumption, the information source has been identified.

- Estimating Requirements

  - Historical Ratio

    The current ratio of public health inspectors to population 1:12,061 was used to project the number of practitioners required in the future to maintain the current level of manpower.

  - Service Target Ratio

    Service target ratio of 1:6,000 and 1:9000 were used based on the range of services, and the ideal estimates from the time analysis system recently introduced in the province.

- Net Manpower Requirements

Table IX.3.4, opposite, shows the projected manpower requirements under each projection approach. The most likely scenario is based on a service target ratio of 1:9,000, under the medium population projection. There is an immediate requirement for 36 additional public health inspectors, and an average of 5 practitioners per year throughout the forecast period.

TABLE IX.4.1

NUMBER OF PUBLIC HEALTH INSPECTORS

IN MANITOBA, 1973 TO 1980

YEAR	MANITOBA CHAPTER, CANADIAN INSTITUTE OF PUBLIC HEALTH INSPECTORS[1]	HEALTH MANPOWER PROVINCIAL REPORT MANITOBA 1979
1973	42	73
1974	47	81
1975	41	81
1976	57	80
1977	60	78
1978	63	81
1979	58	64
1980	66	

Notes: 1. Manitoba Chapter, Canadian Institute of Public Health Inspectors

MANITOBA

a) Legal Controls

The Public Health Act (Chapter P. 210, R.S. 1970), makes provision for the Board of Health to define the scope of public health activities in the province, relating to the preservation of health and the prevention of disease. The board is empowered to make recommendations and review regulations to perform this function.

The certification and licensing requirements are shown in Appendix 2 - Scope and Control of Practice.

b) Insured Services

There are no insured services for this occupation, since public health inspectors do not provide services directly to individuals in the population.

c) Assumptions

- **Manpower Stock**

  Table IX.4.1, opposite, contains the total number of public health inspectors in Manitoba. The count includes those public health inspectors estimated to be actively employed in the province. This estimate was obtained from the Manitoba Chapter of the Canadian Institute of Public Health Inspectors. An estimate was also obtained from the major employers of approved positions, and this indicated an establishment of approximately 75.

TABLE IX.4.2

TOTAL NUMBER OF ACTIVE PUBLIC HEALTH INSPECTORS, IN MANITOBA, BY AGE

AGE GROUP	MALE	FEMALE	TOTAL
20 - 24	2	1	3
25 - 29	3	1	4
30 - 34	13	-	13
35 - 39	11	-	11
40 - 44	7	-	7
45 - 49	1	-	1
50 - 54	4	-	4
55 - 59	2	-	2
60 - 64	3	-	3
65 and over	-	-	-
Unknown	18	-	18
Total	64	2	66

Source: Manitoba Chapter, Canadian Institute of Public Health Inspectors

TABLE IX.4.3

FACTORS AFFECTING MANPOWER SUPPLY

PUBLIC HEALTH INSPECTORS, MANITOBA

FACTOR	ASSUMPTION	SOURCE
Opening Stock	66	C.I.P.H.I.[1]
Net Migration	Lose 2 practitioners annually	C.I.P.H.I.
Net Immigration	0	C.I.P.H.I.
Net Occupational Shifts	Lose 1 practitioner annually	C.I.P.H.I.
Training Output	2 - 3 annually	B.C.I.T. & Chief, Inspection Services Province of Manitoba
Active/Inactive	Typically 3-5 qualified practitioners inactive at any point in time	C.I.P.H.I.
Attrition	Based on current age distribution, assuming retirement at age 65	C.I.P.H.I.

Note: 1. Information provided by Manitoba Chapter, Canadian Institute of Public Health Inspectors

The age distribution is shown in Table IX.4.2. Projections of future requirements were based on an opening stock of 66 in an effort to minimize any error caused by the large number of unknowns in estimating the age distribution.

- Factors Affecting Manpower Supply

The assumptions made with respect to each of the factors which have the potential to affect manpower stock are shown in Table IX.4.3, opposite. These factors include migration, immigration, occupational shifts, training output, active/inactive movements, and attrition. For each assumption, the information source has been identified.

- Estimating Requirements

  - Historical Ratio

The current ratio of public health inspectors to population of 1:15,980 was used to project the number of practitioners required in the future to maintain the current level of manpower.

  - Service Target Ratio

Service target ratio of 1:15,000 and 1:12,000 were used based on the range of services, and on the ideal estimates derived from the time analysis system in the province of Saskatchewan. The range of services provided in Manitoba appear to be comparable with the services provided in the province of Saskatchewan.

TABLE IX.4.4 MANPOWER REQUIREMENTS

PROVINCE: MANITOBA

OCCUPATION: PUBLIC HEALTH INSPECTION

PROJECTED MANPOWER REQUIREMENTS										
YEAR	PROJECTED STOCK	POPULATION APPROACH 1:15980			SERVICE TARGET* 1:12000			SERVICE TARGET 1:9000		
		LOW	MEDIUM	HIGH	LOW	MEDIUM*	HIGH	LOW	MEDIUM	HIGH
1981	65	66	66	67	88	88	89	117	118	118
	NET	1	1	2	23	23	24	52	53	53
1982	64	66	67	67	88	89	89	118	119	119
	NET	2	3	3	24	25	25	54	55	55
1983	62	67	67	68	89	90	90	119	119	120
	NET	5	5	6	27	28	28	57	57	58
1984	59	67	68	68	90	90	91	119	120	121
	NET	8	9	9	31	31	32	60	61	62
1985	57	68	68	69	90	91	92	120	121	122
	NET	11	11	12	33	34	35	63	64	65
1990	49	70	70	71	93	94	95	124	125	127
	NET	21	21	22	44	45	46	75	76	78
1995	38	72	72	74	95	96	98	127	128	131
	NET	34	34	36	57	58	60	89	90	93
2000	32	73	74	76	97	98	101	129	131	135
	NET	41	42	44	65	66	69	97	99	103

Note: The asterisked column (*) represents the most likely scenario for this occupation in Manitoba.

- Net Manpower Requirements

Table IX.4.4, opposite, shows the projected manpower requirements under each projection approach. The most likely scenario is based on a service target ratio of 1:12,000, under the medium population projection. There is an immediate manpower requirement for 23 public health inspectors, and an indicated requirement for 4 practitioners annually throughout the forecast period.

APPENDIX III - SCOPE OF PRACTICE

PUBLIC HEALTH INSPECTORS: CONTROL OF PRACTICE

PROVINCE	CERTIFICATION/LICENSING/REGISTRATION			TRAINING PROGRAM/ACCREDIATION		
	REQUIRED CHARACTERISTICS OF APPLICANTS	CERTIFICATION REQUIREMENTS	LICENSING REQUIREMENTS	LENGTH OF TRAINING & ADMISSION REQUIREMENTS	TRAINING LOCATION	EDUCATIONAL ACCREDITATION
British Columbia R.S. Chapter 161		. Holder of Certificate in Public Health (Canada) or equivalent		. 2 year certificate program. . Graduate of High School, with mathematics, Physics and Chemistry.	. British Columbia Institute of Technology.	
Alberta R.S.A. 1970 Chapter 294 Section 5.6		. Holder of Certificate in Public Health (Canada) or equivalent		. 2 year certificate program. . Graduate of High School, with Mathematics, Physics, and Chemistry.	. Bursary program at British Columbia Institute of Technology.	
Saskatchewan Page 37 R.S. 1978		. Holder of Certificate in Public Health (Canada) or equivalent		. See British Columbia	. Bursary program at British Columbia Institute of Technology	
Manitoba R.S.M. 1970 Cap. Page 210		. Holder of Certificate in Public Health (Canada) or equivalent		. 2 year certificate program. . Graduate of High School, with Mathematics, Physics and Chemistry.		

APPENDIX IV - BIBLIOGRAPHY

BIBLIOGRAPHY OF PUBLIC HEALTH INSPECTORS

D.H.E.W. "A Report to the President and Congress on the Status of Health Professions Personnel in the United States." United States Department of Health Education and Welfare.

"Semi-Annual Survey of the Major Employers of Health and Social Services Personnel" Alberta Health and Social Services Disciplines Committee.

Canadian Public Health Association "Environmental Health Study - Public Health Inspectors" 1968.

McMeiken, J. E. "Public Health Professionals and the Environment: A Study of Perceptions and Attitudes. Environment Canada, Social Science Series No. 5-1973.

Saskatchewan Health Annual Report 1979 - 1980.

"Roll Call '79: A Status Report of Health Personnel in the Province of British Columbia," Report R-12.

Saskatchewan Health, Saskatchewan Health Manpower Annual Report 1978.

"Health and Social Service Manpower in Alberta 1979." Alberta Health and Social Services Disciplines Committee.

"Health Manpower Provincial Report - Manitoba 1979." Research Section, Manitoba Department of Health

"Report of the Task Force for the Development of Minimum Standards in Health Inspection in Alberta." Health Unit Association of Alberta.

"Health Manpower In Ontario - 1980". Strategic Research and Manpower Planning Branch, Ontario Ministry of Health, October, 1980.

Number/
Numéro

3

Province of
British Columbia

Province of
Alberta

Province of
Saskatchewan

Province of
Manitoba

WESTERN CANADA
HEALTH MANPOWER TRAINING STUDY

SECTION III - CATEGORY 3 REPORTS (PART I)

- THE SCOPE OF EXISTING TRAINING PROGRAMS - CATEGORY 3 OCCUPATIONS
- AUDIOLOGIST
- SPEECH PATHOLOGIST
- DENTAL OCCUPATIONS
- DIETICIANS

Report A - THE SCOPE OF EXISTING TRAINING PROGRAMS - CATEGORY 3 OCCUPATIONS
Report 3A - AUDIOLOGIST
Report 3B - SPEECH PATHOLOGIST

Province of
British Columbia

Province of
Alberta

Province of
Saskatchewan

Province of
Manitoba

WESTERN CANADA
HEALTH MANPOWER TRAINING STUDY

Category # 3 - Report A

THE SCOPE OF EXISTING TRAINING PROGRAMS
Category # 3 OCCUPATIONS

Report A - THE SCOPE OF EXISTING TRAINING PROGRAMS - CATEGORY 3 OCCUPATIONS
Report XA - AUDIOLOGIST
Report XB - SPEECH PATHOLOGIST

THE SCOPE OF EXISTING TRAINING PROGRAMS

CATEGORY #3 OCCUPATIONS

PEAT, MARWICK and PARTNERS

MARCH, 1982

THE SCOPE OF EXISTING TRAINING PROGRAMS
CATEGORY #3 OCCUPATIONS

TABLE OF CONTENTS

	PAGE
INTRODUCTION	1.
SECTION 1 - TRAINING PROGRAMS FOR SPEECH PATHOLOGISTS AND AUDIOLOGISTS	1.1
SECTION 2 - TRAINING PROGRAMS FOR DENTAL ASSISTANTS	2.1
SECTION 3 - TRAINING PROGRAMS FOR DENTAL HYGIENISTS	3.1
SECTION 4 - TRAINING PROGRAMS FOR DENTISTS	4.1
SECTION 5 - TRAINING PROGRAMS FOR DIETITIANS	5.1
SECTION 6 - TRAINING PROGRAMS FOR HEALTH RECORDS ADMINISTRATORS/TECHNICIANS	6.1
SECTION 7 - TRAINING PROGRAMS FOR MEDICAL LABORATORY TECHNOLOGISTS	7.1
SECTION 8 - TRAINING PROGRAMS FOR OCCUPATIONAL THERAPISTS	8.1
SECTION 9 - TRAINING PROGRAMS FOR PHARMACISTS	9.1
SECTION 10 - TRAINING PROGRAMS FOR PHYSIOTHERAPISTS	10.1
SECTION 11 - TRAINING PROGRAMS FOR X-RAY TECHNICIANS	11.1
SECTION 12 - TRAINING PROGRAMS FOR RESPIRATORY TECHNOLOGISTS	12.1

THE SCOPE OF EXISTING TRAINING PROGRAMS
CATEGORY #3 - OCCUPATIONS

INTRODUCTION

In this report, we review the scope of existing training programs in Western Canada for Category #3 Occupations.

The report is divided into thirteen sections. Each section represents a health occupation group. The sections are as follows:

1. Speech Pathologists and Audiologists
2. Dental Assistants
3. Dental Hygienists
4. Dentists
5. Dietitians
6. Health Records Administrators and Technicians
7. Medical Laboratory Technologists
8. Occupational Therapists
9. Pharmacists
10. Physiotherapists
11. X-Ray Technologists
12. Respiratory Technologists

Within each section, we discuss the existing training programs by province. A general description is given of each program along with the projected average number of enrolments and graduations.

EXHIBIT I.1

TRAINING PROGRAMS FOR SPEECH PATHOLOGISTS AND AUDIOLOGISTS IN WESTERN CANADA

PROJECTED NUMBER OF AVERAGE ENROLMENTS AND GRADUATES

Province and Institution	Projected Number of Average Enrolments and Graduates															Source
	Enrolments					Speech Graduates					Audio Graduates					
	1981	1982	1983	1984	1985	1981	1982	1983	1984	1985	1981	1982	1983	1984	1985	
British Columbia University of British Columbia	15	30*	30*	30*	30*	6	6	6	14*	14*	4	4	4	8*	8*	1
Alberta University of Alberta	25	25	25	25	25	24	24	24	24	24						2
Total Projected For Western Canada	40	55	55	55	55	30	30	30	38	38	4	4	4	8	8	

Source:

* These projections are made on the assumption that in 1982, the program will expand the number of enrolments.

1. University of British Columbia
2. University of Alberta

SECTION 1

TRAINING PROGRAM FOR SPEECH PATHOLOGISTS AND AUDIOLOGISTS

1.0 WESTERN CANADA

There are two programs training Speech Pathologists in Western Canada. They graduate approximately 30 students a year. (Note Exhibit 1)

There is one program providing training for Audiologists in Western Canada. This program graduates approximately 4 students a year.

1.1 BRITISH COLUMBIA

University of British Columbia

The University of British Columbia, (U.B.C.), offers a two year post-graduate program in Speech Pathology and Audiology. Graduates from the prcgram receive a Master of Science Degree. A four year under-graduate degree is required as a pre-requisite to enter the program.

Upon entering the program, all students take a combined general course for the first year. In the second year of study, a decision is made regarding the area of specialization; speech pathology or audiology. After graduation, students are only qualified to work in their area of specialty. The program does not train dually qualified Speech Pathologists/Audiologists. Should students prefer to become dually trained, a third year of study is required in the alternative specialty area.

The enrolment quota for 1981 was 15 students. In the past, the average number of students graduating has been 10. An average of 6 students have been speech pathologists and 4 have been audiologists. (Note Exhibit 1.1)

Program expansion is currently under review. Should this result, the quota is expected to increase to 30 students of which 20 are expected to graduate. The breakdown for specialty per year is predicted to be 10 - 14 speech pathologists and 6 - 10 audiologists. These changes are expected for the 1982 enrolment year.

1.2 ALBERTA

University of Alberta

A four year program is offered at the University of Alberta (U. of A.) leading towards a Bachelor of Science Degree in Speech and Audiology. The program requires students to take a pre-professional year of courses at the university level. Students graduating from the U. of A. program, receive the academic qualifications required for a Speech Pathologist.

The enrolment quota for 1981 was 25 students. The average number of students graduating a year from the program is 24. These numbers of enrolment and graduates are expected to continue.

A Masters of Science Degree in Speech and Audiology is being planned at the University of Alberta. The program will prepare students for research work in the area of speech communications.

1.3 SASKATCHEWAN

There are no formal training programs in Speech and Audiology available in Saskatchewan.

The provincial government extends 4 bursaries, which are available to individuals wishing to pursue studies in either speech or audiology. In the past, usually 3 of the bursaries have gone towards studies in speech pathology and 1 has gone towards studies in audiology. Currently, bursaries are only available for study at the graduate degree level. Plans are being made by the Saskatchewan Government to secure 3 seats in the Speech and Audiology program at the University of Alberta.

1.4 MANITOBA

There are no formal training programs in Speech and Audiology in Manitoba.

Bursaries are made available by the Provincial government for studies in the general area of speech and hearing communications. In the past, an average of 11 bursaries have been awarded to this area. In 1981, 7 of these bursaries have been given to speech pathology, and 1 to a student training in audiology, with the remainder going to special programs in an area communication disorders.

EXHIBIT 2.1
TRAINING PROGRAM FOR DENTAL ASSISTANTS IN WESTERN CANADA
PROJECTED NUMBER OF AVERAGE ENROLMENTS AND GRADUATES

Province and Institution	Projected Number of Average Enrolments and Graduates										Source
	Enrolments					Graduates					
	1981	1982	1983	1984	1985	1981	1982	1983	1984	1985	
British Columbia											
Camosun College	56	56	56	56	56	42	42	42	42	42	1
Douglas College	48	48	48	48	48	34	34	34	34	34	1
Fraser Valley College	20	20	20	20	20	15	15	15	15	15	1
Malaspina College	36	36	36	36	36	34	34	34	34	34	1
College of New Caledonia	32	32	32	32	32	22	22	22	22	22	1
Northern Lights	8	8	8	8	8	8	8	8	8	8	1
Okanagan Community College	24	24	24	24	24	23	23	23	23	23	1
Vancouver Vocational College	73	73	73	73	73	50	50	50	50	50	1
	297	297	297	297	297	228	228	228	228	228	
Alberta											
North Alta. Instit. of Tech.	75	75	75	75	75	62	62	62	62	62	2
South Alta. Instit. of Tech.	40	40	40	40	40	36	36	36	36	36	2
	115	115	115	115	115	98	98	98	98	98	
Saskatchewan											
Kelsey Institute	51	51	51	51	51	40	40	40	40	40	3
Wascana Institute	50	50	50	50	50	39	39	39	39	39	3
	101	101	101	101	101	79	79	79	79	79	
Manitoba											
Kewatin Community College	20	20	20	20	20	17	17	17	17	17	4
Red River Community College	50	50	50	50	50	43	43	43	43	43	4
Tech. Vocational High School	30	30	30	30	30	25	25	25	25	25	4
	100	100	100	100	100	85	85	85	85	85	
Total Projected for West. Canada	613	613	613	613	613	490	490	490	490	490	
Corespondence Course North. Alta. Instit. of Technology											
British Columbia						61	61	61	61	61	5
Alberta						55	55	55	55	55	5
Saskatchewan						3	3	3	3	3	5
Manitoba						1	1	1	1	1	5
Tot. Projected for Western Canada						120	120	120	120	120	

Source:

1. All the average projected enrolment and graduation figures were determined from information received from each of the institutions except for the projections for Northern Lights College and Vancouver Community College which were taken from direct correspondence with government sources.

2. The average projected enrolment and graduation figures were determined from the information received from each of the institutions.

3. The average projected enrolment and graduation figures were determined from the Health Science Education Statistics, Saskatchewan Continuing Education.

4. The average projected enrolment and graduation figures were determined from information received from each of the institutions.

5. The average projected enrolment and graduation figures were determined from information received from the Northern Alberta Institute of Technology.

SECTION 2

TRAINING PROGRAMS FOR DENTAL ASSISTANTS

2.0 WESTERN CANADA

There are sixteen programs for Dental Assistants in Western Canada. They graduate approximately 613 per year. (Note Exhibit 2.1)

A correspondence course for Dental Assistants is offered through the Northern Alberta Institute of Technology in Alberta. Approximately 120 students from Western Canada graduate a year. (Note Exhibit 2.1)

2.1 BRITISH COLUMBIA

British Columbia has eight programs for Dental Assistants and graduate approximately 228 students a year. In addition, approximately 61 students will graduate from the Dental Assistant correspondence course.

Camosun College

A Dental Assistant program is offered at Camosun College. This is a 10 month program.

The 1981 enrolment for the course was 56. The number of students graduating each year is approximately 42. These enrolment and graduation numbers are expected to remain constant. (Note Exhibit 2.1)

Douglas College

A Dental Assistant program is offered at Douglas College. It is a 10 month program.

The enrolment for 1981 was 48 with an estimated graduation of 34 students. These numbers for enrolment and graduation are not expected to change. (Note Exhibit 2.1)

Fraser Valley College

Fraser Valley College offers an ten month Dental Assistant training program.

The 1981 enrolment for the course was 20. The number of students graduating each year is approximately 15. These enrolment and graduation numbers are expected to continue. (Note Exhibit 2.1)

Malaspina College

Malaspina College offers a ten month course which trains Dental Assistants.

The 1981 enrolments for the course was 36. The number of students graduating each year is approximately 34. These enrolment and graduation numbers are expected to remain constant. (Note Exhibit 2.1)

College of New Caledonia

The College of New Caledonia offers a ten month Dental Assistants training program.

The enrolment quota for 1981 was 32 with an estimated graduation of 22 students. These numbers for enrolment and graduation are not expected to continue. (Note Exhibit 2.1)

Northern Lights College

Northern Lights College offers a ten month program for Dental Assistants.

The 1981 enrolment for the course was 8. The number of students graduating each year is approximately 8. These numbers for enrolment and graduation are not expected to change. (Note Exhibit 2.1)

Okanagan College

The Okanagan College offers a ten month Dental Assistant training program.

The enrolment quota for 1981 was 24 with an estimated graduation of 23 students. These numbers for enrolment and graduation are not expected to change significantly. (Note Exhibit 2.1)

Vancouver Community College

A Dental Assistant program is offered at the Vancouver Community College. It is a 10 month program.

The 1981 enrolment for the course was 73. The number of students graduating each year is approximately 50. These numbers for enrolment and graduation are expected to continue. (Note Exhibit 2.1)

Dental Assistants Graduating from Correspondence Courses

Northern Alberta Institute of Technology

In 1981, approximately 61 students from British Columbia will graduate from a twenty month Dental Assistant correspondence course offered through the Northern Alberta Institute of Technology in Alberta.

2.2 ALBERTA

Alberta offers two training programs for Dental Assistants and graduate approximately 98 students a year. An additional 55 students will graduate from correspondence courses.

Northern Alberta Institute of Technology

The Northern Alberta Institute of Technology offers a one year program in Dental Assisting.

The enrolment quota for 1981 was 75 with an estimated graduation of 62 students. These numbers for enrolment and graduation are not expected to change significantly. (Note Exhibit 2.1)

Southern Alberta Institute of Technology

The Southern Alberta Institute of Technology offers a training program for Dental Assistants. It is a one year program.

The 1981 enrolment for the course was 40. The number of students graduating each year is approximately 36. These enrolment and graduation numbers are expected to continue. (Note Exhibit 2.1)

Dental Assistants Graduating from Correspondence Courses

Northern Alberta Institute of Technology

The Continuing Education Division of the Northern Alberta Institute of Technology offers a 20 month national correspondence course for Dental Assistants. There are two intake dates a year. The course is designed to upgrade the training levels of Dental Assistants who have been trained on-the-job. Individuals interested in the course must have worked in a dental office 6 months before entering the course and must remain employed while taking the course.

In 1981, Alberta will have approximately 55 students graduate from the Dental Assistant correspondence course offered through the Northern Alberta Institute of Technology.

2.3 SASKATCHEWAN

There are two programs which train Dental Assistants in Saskatchewan. They graduate approximately 79 students a year. In addition, approximately 3 students will graduate from correspondence courses.

Kelsey Institute

A Dental Assistant program is offered through the Kelsey Institute. It is a thirty-eight week program.

The enrolment quota for 1981 was 51 with an estimated graduation of 40 students. These enrolment and graduation numbers are expected to remain constant. (Note Exhibit 2.1)

Wascana Institute

A Dental Assistant program is offered at Wascana Institute. It is a ten month program in which graduates receive certification.

The 1981 enrolment for the course was 50. The number of students graduating each year is approximately 39. These numbers for enrolment and graduation are not expected to change. (Note Exhibit 2.1)

Dental Assistants Graduating from Correspondence Courses

Northern Alberta Institute of Technology

In 1981, Saskatchewan will have approximately 3 students graduating from the Dental Assistant correspondence course offered through the Northern Alberta Institute of Technology.

2.4 MANITOBA

Manitoba has three programs which train Dental Assistants. They graduate aproximately 85 students a year. In addition, approximately 1 student a year graduates from a correspondence course.

Kewatin Community College

Kewatin Community College offers a ten month program in Dental Assisting.

The enrolment quota for 1981 was 20 with an estimated graduation of 17 students. These numbers for enrolment and graduation are expected to continue. (Note Exhibit 2.1)

Red River Community College

A ten month Dental Assistants program is offered at Red River College.

The enrolment quota for 1981 was 50, with an estimated graduation of 43 students. These enrolment and graduation numbers are expected to remain constant. (Note Exhibit 2.1)

Technical Vocational High School

A Dental Assistants program is offered at the Technical Vocational High School. It is a two year program, which is offered to students at the grade 11 and 12 level and is combined with the regular curriculum.

The enrolment quota for 1981 was 30 with an estimated graduation of 25 students. These numbers for enrolment and graduation are not expected to fluctuate. (Note Exhibit 2.1)

Dental Assistants Graduating from Correspondence Courses

Northern Alberta Institute of Technology

In 1981, students will graduate from the Dental Assistant correspondence course offered through the Northern Alberta Institute of Technology.

EXHIBIT 3.1

TRAINING PROGRAMS FOR DENTAL HYGIENISTS IN WESTERN CANADA
PROJECTED NUMBER OF AVERAGE ENROLMENTS AND GRADUATES

Province and Institution	Projected Number of Average Enrolments and Graduates										Source
	Enrolments					Graduates					
	1981	1982	1983	1984	1985	1981	1982	1983	1984	1985	
British Columbia											
University of British Columbia	20	20	20	20	20	19	19.	19	19	19	1
Alberta											
University of Alberta	40	40	40	40	40	32	32	32	32	32	2
Saskatchewan											
Wascana Institute	10	10	10	10	10	10	10	10	10	10	3
Manitoba											
University of Manitoba	26	26	26	26	26	25	25	25	25	25	4
Total Projected For Western Canada	96	96	96	96	96	86	86	86	86	86	-

Source:

1. University of British Columbia
2. University of Alberta
3. Health Science Education Statistics (1981) Saskatchewan Continuing Education, Government of Saskatchewan
4. Health Manpower Provincial Report Manitoba, 1979

SECTION 3
TRAINING PROGRAMS FOR DENTAL HYGIENISTS

3.1 WESTERN CANADA

There are six programs for Dental Hygienists in Western Canada. They graduate approximately 86 students per year. (Note Exhibit 3.1)

3.1 BRITISH COLUMBIA

University of British Columbia

The Faculty of Dentistry at the University of British Columbia offers a two year program in Dental Hygiene. As a pre-requisite to enter the first year of the Dental Hygiene Program, students must complete one year of specified University first year courses. Students graduating from the program receive a diploma in Dental Hygiene.

The enrolment quota for 1981 was 20 with an estimated graduation of 19 students. These enrolment and graduation numbers are expected to continue. (Note Exhibit 3.1)

A Dental Hygiene Program has been planned at Douglas College to begin in 1982. The enrolment is expected to be 24 students. There is still some discussion as to whether the program will begin.

3.2 ALBERTA

University of Alberta

The University of Alberta offers a two year program in Dental Hygiene. Graduates from the program receive a diploma in Dental Hygiene.

The 1981 enrolment for the course was 40. The number of students graduating each year is approximately 32. These enrolment and graduation numbers are expected to remain constant. (Note Exhibit 3.1)

3.3 SASKATCHEWAN

Wascana Institute of Technology

A program which provides training in Dental Hygiene is offered at the Wascana Institute of Technology. The program is only offered to individuas who have completed a two year training program in Dental Nursing. The Dental Hygienist program is six months long. Students graduate with the academic qualifications necessary to work as a Dental Hygienist.

The student enrolment for 1981 was 10. All of these students are expected to graduate. These enrolment and graduation numbers are expected to remain constant. (Note Exhibit 3.1)

3.4 MANITOBA

University of Manitoba

A Dental Hygienists program is offered through the School of Dental Hygiene at the University of Manitoba. It is a two year program, where students graduate with a diploma in Dental Hygiene.

The 1981 enrolment quota for the course is usually 26 students. The number of students graduating each year is approximately 25. These enrolment and graduation numbers are expected to continue. (Note Exhibit 3.1)

EXHIBIT 4.1

TRAINING PROGRAMS FOR DENTISTS IN WESTERN CANADA

PROJECTED NUMBER OF AVERAGE ENROLMENTS AND GRADUATES

Province and Institution	Projected Number of Average Enrolments and Graduates										Source
	Enrolments					Graduates					
	1981	1982	1983	1984	1985	1981	1982	1983	1984	1985	
British Columbia											
University of British Columbia	40	40	40	40	40	38	38	38	38	38	1
Alberta											
University of Alberta	50	50	50	50	50	47	47	47	47	47	2
Saskatchewan											
University of Saskatchewan	25	25	25	25	25	19	19	19	19	19	3
Manitoba											
University of Manitoba	33	33	33	33	33	30	30	30	30	30	4
Total Projected For Western Canada	148	148	148	148	148	134	134	134	134	134	

Source:

1. University of British Columbia
2. University of Alberta
3. Health Science Education Statistics (1981) Saskatchewan Continuing Education, Government of Saskatchewan
4. University of Manitoba

SECTION 4

TRAINING PROGRAMS FOR DENTISTS

4.0 WESTERN CANADA

There are four programs in Western Canada which provide training in Dentistry. These programs graduate an average of 134 students a year. (Note Exhibit 4.1)

4.1 BRITISH COLUMBIA

University of British Columbia

The Faculty of Dentistry at the University of British Columbia offers a four year Doctor of Dental Medicine Degree program. Before being considered for admission to the first year of the Dentistry Program, students are required to complete the equivalent of three years of academic courses through either the Faculty of Arts or the Faculty of Sciences at the University of British Columbia.

First year enrolment of the dentistry program in 1981 was 40 students. The number of students graduating each year is approximately 38. These numbers are expected to continue. (Note Exhibit 4.1)

4.2 ALBERTA

University of Alberta

The University of Alberta offers a four year Doctor of Dental Surgery Degree program. Before accepted into the dentistry program, students must complete pre-requisite requirements which include two full years of academic courses through either the Faculty of Arts or the Faculty of Science at the University of Alberta.

The enrolment quota for 1981 was 50 students, with an estimated graduation of between 46 to 48 students. These student enrolment and graduation numbers are expected to continue. (Note Exhibit 4.1)

4.3 SASKATCHEWAN

University of Saskatchewan

The College of Dentistry at the University of Saskatchewan offers a five year Doctor of Dental Medicine Degree program. Before entering the course, the students require one pre-professional year of academic course work through either the Faculty of Arts or the Faculty of Science.

The enrolment quota for 1981 was 25 students. The number of students graduating each year are expected to average around 19. Both of these levels are expected to be continued. (Note Exhibit 4.1)

4.4 MANITOBA

University of Manitoba

The University of Manitoba, through the Faculty of Dentistry offers a four year Doctor of Dental Medicine Degree. Pre-professional requirements , before entering the first year of the program include two full years of academic course work through either the Faculty of Arts or the Faculty of Science.

In 1981, 33 students were enrolled into the program. The number of students expected to graduate is 30. This level of student enrolment and graduates is expected to continue. (Note Exhibit 4.1)

EXHIBIT 5.1
TRAINING PROGRAM FOR DIETICIANS IN WESTERN CANADA
PROJECTED NUMBER OF AVERAGE ENROLMENTS AND GRADUATES

Province and Institution	Projected Number of Average Enrolments and Graduates										Source
	Enrolments					Graduates					
	1981	1982	1983	1984	1985	1981	1982	1983	1984	1985	
British Columbia											
University of British Columbia						23	23	23	23	23	1
Alberta											
University of Alberta						20	20	20	20	20	2
Saskatchewan											
University of Saskatchewan	16	16	16	16	16	13	13	13	13	13	3
Manitoba											
University of Manitoba						22	22	22	22	22	4
Total Projected for West. Canada						83	83	83	83	83	

Source:

1. University of British Columbia
2. University of Alberta
3. Health Science Education Statistics (1981) Saskatchewan Continuing Education, Government of Saskatchewan
4. Canadian Dietetic Association

SECTION 5
TRAINING PROGRAMS FOR DIETITIANS

5.0 WESTERN CANADA

There are four programs in Western Canada which provide the academic training necessary to prepare individuals to pursue careers as dietitians. There are approximately 83 graduates a year from these programs in Western Canada. (Note Exhibit 5.1) Graduates of these programs usually require an internship from an institution accredited by the Canadian Dietetic Association to qualify as a professional dietitian.

5.1 BRITISH COLUMBIA

University of British Columbia

The University of British Columbia offers a four year Bachelor of Home Economics Degree in the area of Human Nutrition and Dietetics.

In 1981, 28 students who graduated were eligible to apply for a dietetic internship. The anticipated number of future graduates are expected to average at this level. (Note Exhibit 5.1)

5.2 ALBERTA

University of Alberta

A four year Bachelor Science Degree, from the Faculty of Home Economics, majoring in Food and Nutrition is available at the University of Alberta.

On the average, 20 students graduate each year with qualifications to pursue an internship in dietetics. This number of graduates is expected to be continued. (Note Exhibit 5.1)

In Alberta, an alternative route of training has been introduced for individuals interested in food service administration and dietetics. A four year program is ofered by the Faculties of Home Economics and Business Administration and Commerce. Students graduate with a Bachelor of Commerce Degree with a major in Food and Nutrition. With specific courses, graduates from this program are expected to be eligible to pursue a dietetic internship. As of 1981, there have been no enrolments into the program.

5.3 SASKATCHEWAN

University of Saskatchewan

The University of Saskatchewan offers a four year Bachelor of Science Degree in Home Economics, with a major in Dietetics and Nutrition.

The enrolment for this program is approximately 16 students a year. In 1981, 13 students graduating from the program were eligible for a dietetic internship. The number of student enrolments and graduates are expected to stay fairly constant in the future. (Note Exhibit 5.1)

5.4 MANITOBA

University of Manitoba

A four year Bachelor of Human Ecology with a major in Dietetics and Nutrition is available from the University of Manitoba.

In 1981, 22 students graduated from the program who were elegible to apply for a dietetic internship. This average number of graduates is expected to continue in the near future. (Note Exhibit 5.1)

EXHIBIT 6.1

TRAINING PROGRAM FOR HEALTH RECORDS ADMINISTRATORS/TECHNICIANS IN WESTERN CANADA
PROJECTED NUMBER OF AVERAGE ENROLMENTS AND GRADUATES

Province and Institution	Projected Number of Average Enrolments and Graduates										Source
	Enrolments					Graduates					
	1981	1982	1983	1984	1985	1981	1982	1983	1984	1985	
Health Records Administrator/Tech.											
British Columbia											
B.C. Institute of Technology	16	16	16	16	16	13	13	13	13	13	1
Alberta											
Nort. Alta. Instit. of Technology	17	17	17	17	17	14	14	14	14	14	2
Saskatchewan											
Wascana Institute	15	15	15	15	15	8	8	8	8	8	3
Total Projected for Western Canada	48	48	48	48	48	35	35	35	35	35	
Health Records Technicians											
Alberta											
Sout. Alta. Instit. of Technology	22	22	22	22	22	10	10	10	10	10	4
Saskatchewan*											
Wascana Institute						6	6	6	6	6	5
Manitoba											
Red River Community College	30	30	30	30	30	24	24	24	24	24	6
Total Projected for Western Canada	52	52	52	52	52	40	40	40	40	40	

Source:

* These graduates indicate the average number of students who complete the first year of the Wascana two year program in Health Records Technology.

1. British Columbia Institute of Technology
2. Northern Alberta Insitute of Technology
3. Health Science Education Statistics (1981) Saskatchewan Continuing Education, Government of Saskatchewan
4. Southern Alberta Institute of Technology
5. Health Science Education Statistics (1981) Saskatchewan Continuing Education, Government of Saskatchewan
6. Red River Community College

SECTION 6

TRAINING PROGRAMS FOR HEALTH RECORDS ADMINISTRATORS/TECHNICIANS

6.0 WESTERN CANADA

In Western Canada, there are three programs which train Health Record Administrators. They graduate approximately 35 students a year. (Note Exhibit 6.1) These programs may be referred to Health Records Technology programs or Health Records Administrator programs.

There are three institutions in Western Canada which train students who are eligible to work as Health Records Technicians. These institutions graduate approximately 40 students a year. (Note Exhibit 6.1)

6.1 BRITISH COLUMBIA

Health Records Administrator

British Columbia Institute of Technology

A program in Health Records Technology is offered at the British Columbia Institute of Technology. It is a two year program. Students graduate with the academic qualifications to work as a Health Record Technologist, which is the equivalent of a Health Record Administrator in other provinces.

The enrolment quota for 1981 was 16 with an estimated graduation of 13 students. These enrolment and graduation numbers are expected to remain constant. (Note Exhibit 6.1)

Health Record Technician

Currently in British Columbia there are no training programs which graduate Health Records Technicians. There has been discussion for the development of a one year technician program at the British Columbia Institute of Technology.

6.2 ALBERTA

Health Records Administrator

Northern Alberta Institute of Technology

A Health Record Administrator training program is offered at the Northern Alberta Institute of Technology. It is a two year program.

The 1981 enrolment for the course was 17. The number of students graduating each year is approximately 14. These enrolment and graduation numbers are expected to remain constant. (Note Exhibit 6.1)

Health Records Technician

Southern Alberta Institute of Technology

The Southern Alberta Institute of Technology offers a diploma program in Health Records Technology. It is a one year program. Students graduating from the program are qualified as Health Records Technicians.

The enrolment quota for 1981 was 22 with an estimated graduation of 10 students. These numbers for enrolment and graduation are not expected to change. (Note Exhibit 6.1)

6.3 SASKATCHEWAN

Health Records Administrator

Wascana Institute

A two year program in Health Records Technology is offered at the Wascana Institute. The students who graduate are qualified to work as Health Records Administrators.

The enrolment quota for the program is 15 students. Approximately 8 of the students are expected to graduate from the two year program. These numbers of enrolments and graduates are expected to continue as an average in the future. (Note Exhibit 6.1)

Health Records Technician

Wascana Institute

In Saskatchewan, there is no separate training program for Health Records Technicians. However, students completing the first year of the Wascana Institute, Health Records Technology program, are eligible for certification as a Health Record Technician. In the past, between 4 to 8 students a year have chosen this route. (Note Exhibit 6.1)

6.4 MANITOBA

Health Records Administrator

In Manitoba, there is no separate training program for Health Records Administrators.

Health Records Technician

Red River Community College

A Health Record Technician program is offered at the Red River Community College. It is a 10 month program in which graduates are qualified to work as Health Record Technicians. (Note Exhibit 6.1)

The enrolment quota for 1981 was 30 with an estimated graduation of 24 students. These numbers for enrolment and graduation are not expected to remain constant. (Note Exhibit 6.1)

EXHIBIT 7.1
TRAINING PROGRAM FOR MEDICAL LABORATORY TECHNOLOGISTS IN WESTERN CANADA
PROJECTED NUMBER OF AVERAGE ENROLMENTS AND GRADUATES

Province and Institution	Projected Number of Average Enrolments and Graduates										Source
	Enrolments					Graduates					
	1981	1982	1983	1984	1985	1981	1982	1983	1984	1985	
British Columbia											
B.C. Institute of Technology	40	40	40	40	40	39	39	39	39	39	1
Cariboo College	24	24	24	24	24	22	22	22	22	22	1
University of British Columbia	9	9	9	9	9	4	4	4	4	4	1
	73	73	73	73	73	65	65	65	65	65	
Alberta											
North.Alta.Instit. of Technology	63	65	65	65	65	49	49	49	49	49	2
South.Alta.Instit. of Technology	46	46	46	46	46	27	27	27	27	27	2
University of Alberta	35	35	35	35	35	18	18	18	18	18	2
	144	146	146	146	146	94	94	94	94	94	
Saskatchewan											
Kelsey Institute	24	24	24	24	24	24	24	24	24	24	3
University of Regina	23	23	23	23	23	7	7	7	7	7	3
	47	47	47	47	47	31	31	31	31	31	
Manitoba											
Red River Community College	70	70	70	70	70	56	56	56	56	56	4
Total Projected for Western Canada	334	336	336	336	336	250	250	250	250	250	

Source:

1. All the average projected enrolment and graduation figures were determined from information received from each of these institutions.
2. The average projected enrolment and graduation figures were determined from information received from each of the institutions.
3. The average projected enrolment and graduation figures were determined from the Health Science Education Statistics, Saskatchewan Continuing Education.
4. The average projected enrolment and graduation figures were determined from information received from Red River Community College.

SECTION 7

TRAINING PROGRAMS FOR MEDICAL LABORATORY TECHNOLOGISTS

7.0 WESTERN CANADA

There are eleven programs for Medical Laboratory Technologists in Western Canada. They graduate approximately 250 students a year. (Note Exhibit 7.1)

7.1 BRITISH COLUMBIA

British Columbia has three programs graduating Medical Laboratory Technologists. Approximately 65 students graduate a year from these programs.

British Columbia Institute of Technology

A Medical Laboratory Technology program is offered at the British Columbia Institute of Technology. It is a three year program.

The enrolment quota for 1981 was 40 with an estimated graduation of 39 students. These enrolment and graduation numbers are expected to remain constant. (Note Exhibit 7.1)

Cariboo College

The Cariboo College offers a two year Medical Laboratory Technology training program.

The 1981 enrolment for the course was 24. The number of students graduating each year is approximately 22. These enrolment and graduation numbers are expected to continue. (Note Exhibit 7.1)

University of British Columbia

The University of British Columbia (U.B.C.), offers a two year Bachelor of Medical Laboratory Science degree program in Medical Laboratory Technology. Individuals interested in the program must have graduated from an approved Institute of Technology or College with an approved two year program in Medical Laboratory Technology and have completed one year of in-hospital laboratory training.

The enrolment quota for 1981 was 9 with an estimated graduation of 4 students. These numbers for enrolment and graduation are not expected to fluctuate. (Note Exhibit 7.1)

First Year Programs

The College of New Caledonia and Camosun College both offer the first year of a Medical Laboratory Technology program. Upon completion of the ten month course, students are eligible to transfer into a second year program.

7.2 ALBERTA

Alberta has three training programs for Medical Laboratory Technologists and graduate approximately 94 students a year.

Northern Alberta Institute of Technology

The Northern Alberta Institute of Technology offers a two year program in Medical Laboratory Technology.

The 1981 enrolment for the course was 63. The number of students graduating each year is approximately 49. In 1982 the enrolment quota will rise to 65. At this point these enrolment and graduation numbers are expected to remain constant. (Note Exhibit 7.1)

Southern Alberta Institute of Technology

The Southern Alberta Institute of Technology offers a two year Medical Laboratory Technologists training program.

The enrolment quota for 1981 was 46 with an estimated graduation of 27 students. These numbers for enrolment and graduation are not expected to change. (Note Exhibit 7.1)

University of Alberta

The University of Alberta offers a four year Medical Laboratory Technologists training program. Upon graduation students receive a Bachelor of Science degree.

The 1981 enrolment for the course was 35. The number of students graduating each year is approximately 18. These enrolment and graduation numbers are expected to remain constant. (Note Exhibit 7.1)

7.3 SASKATCHEWAN

Saskatchewan has two training programs for Medical Laboratory Technologists and graduate approximately 31 students per year.

Kelsey Institute

The Kelsey Institute offers a one year program in Medical Laboratory Technology.

The enrolment quota for 1981 was 24 with an estimated graduation of 24 students. These enrolment and graduation numbers are expected to remain constant. (Note Exhibit 7.1)

University of Regina

The University of Regina offers a two year Laboratory Technologists program and a three year bachelor of Laboratory Technology program. Students intending to pursue either program enter at the same level. After the second year a choice is made to pursue the certificate program or take a third year of courses and obtain a Bachelor degree in Laboratory Technology.

The 1981 enrolment for the course was 23. Of those an estimated 7 students are expected to graduate with a Laboratory Technologists certificate and 4 students are expected to graduate with a bachelor of Laboratory Technology degree. These enrolment and graduation numbers are expected remain constant. (Note Exhibit 7.1)

7.4 MANITOBA

Red River Community College

The Red River Community College offers a two year program graduating Medical Laboratory Technology.

The 1981 enrolment for the course was 70 with an estimated graduation of 56 students. These enrolment and graduation numbers are expected to continue. (Note Exhibit 7.1)

EXHIBIT 8.1

TRAINING PROGRAM FOR OCCUPATIONAL THERAPISTS IN WESTERN CANADA

PROJECTED NUMBER OF AVERAGE ENROLMENTS AND GRADUATES

Province and Institution	Projected Number of Average Enrolments and Graduates										Source
	Enrolments					Graduates					
	1981	1982	1983	1984	1985	1981	1982	1983	1984	1985	
British Columbia University of British Columbia	40*	40*	20*	20*	20*	13	13	13	13	13	1**
Alberta University of Alberta	30	30	30	30	30	26	26	26	26	26	2
Manitoba University of Manitoba	20	20	20	20	20	17	17	17	17	17	3
Total Projected for Western Canada	90	90	90	90	90	56	56	56	56	56	

* These enrolments include students in the Combined Physical and Occupational Therapy Program for 1981 and 1982. The 1983 to 1985 enrolments are projected on the assumption that the combined program will be split into two separate programs.

** Note: The graduation numbers as of 1987 are projected at 18.

1. University of British Columbia
2. University of Alberta
3. University of Manitoba

SECTION 8

TRAINING PROGRAMS FOR OCCUPATIONAL THERAPISTS

8.0 WESTERN CANADA

There are three programs in Western Canada which provide training in occupational therapy. These programs graduate approximately 56 students a year. (Note Exhibit 8.1)

8.1 BRITISH COLUMBIA

University of British Columbia

In British Columbia, training in occupational therapy is available from the School of Rehabilitation Medicine, at the University of British Columbia. The program offered is a four year combined course in physical and occupational therapy. Students graduate with a Bachelor of Science Degree in Rehabilitation Medicine. As a pre-requisite to the program, students are required to have one year of specified university level courses. After the pre-requisite year, students qualified to enter the program are admitted to the second year.

The enrolment quota for 1981 was 40 students. In the past, an average of 13 of the graduating students have chosen work in the area of occupational therapy. Plans have been made to split the combined Physical and Occupational Therapy Program into two separate programs. Therefore, students would be trained as either physical therapists or occupational therapists. As a separate program, the enrolment quota for occupational therapy will be 20 students, with an anticipated graduation of 18. These changes are expected to take place in 1983. (Note Exhibit 8.1)

8.2 ALBERTA

University of Alberta

A training program in occupational therapy is available through the Faculty of Rehabilitation Medicine at the University of Alberta.

Students graduate with a four year Bachelor of Science Degree in Occupational Therapy. The first year of the degree requires students to take a pre-professional year of university level courses through the Faculty of Arts or Sciences.

In the past, the University of Alberta have graduated occupational therapists at both the diploma and the degree level. The diploma level is no longer offered.

The quota for new students in the degree program is 30 with an anticipated graduation of 26 new students. In addition to the new student graduates, the program also has space for occupational therapists with their diplomas who wish to pursue a degree. The number of graduates in this situation vary each year.

An accelerated 23 month course in occupational therapy has been discussed by the University of Alberta. If implemented, the course would be available to individuals who have completed a first degree and wish to pursue additional studies to obtain qualifications as a occupational therapist. Students graduating from the program would receive a Bachelor of Science Degree in Occupational Therapy. If plans procede, the program would be incorporated for a three year period and is expected to double the number of occupational therapy graduates for three years.

8.3 SASKATCHEWAN

There is no program in Saskatchewan which trains occupational therapists.

Bursaries are awarded by the Provincial government to individuals who are interested in pursuing studies in occupational therapy. Approximately 8 bursaries are available each year.

Saskatchewan has an agreement with the University of Alberta for the contract space of four seats in their occupational therapy program. Under the agreement, the Saskatchewan students compete with the Alberta students to qualify for entrance into the program. As a

result, the number of Saskatchewan students entering the University of Alberta Occupational Therapy program varies from year to year.

Negotiations are being made with the University of Manitoba to obtain guaranteed seats in their occupational therapy program. If approved, four seats are expected to be available for Saskatchewan students.

8.4 MANITOBA

University of Manitoba

The University of Manitoba offers a four year Bachelor of Medical Rehabilitation Degree (Occupational Therapy.) The completion of one pre-professional year is required before students are admitted in the occupational therapy program. Students admitted, enter the second year of the program.

Previously, the University of Manitoba offered both, diploma and degree level programs in occupational therapy. The last year of the diploma program in occupational therapy was in 1977 - 1978.

The enrolment quota for 1981 was 20. The number of students expected to graduate are 17. These enrolments and graduation numbers are for new students who have never received training in occupational therapy. The program also enrols occupational therapists with a diploma who want to upgrade to a degree. The number of occupational therapists in this position varies each year.

The future enrolment quota is expected to increase should Saskatcheewan secure guaranteed seats in the University of Manitoba Occupational Therapy program. The enrolment would increase by the number of seats secured.

EXHIBIT 9.1
TRAINING PROGRAMS FOR PHARMACISTS IN WESTERN CANADA
PROJECTED NUMBER OF AVERAGE ENROLMENTS AND GRADUATES

Province and Institution	Projected Number of Average Enrolments and Graduates										Source
	Enrolments					Graduates					
	1981	1982	1983	1984	1985	1981	1982	1983	1984	1985	
British Columbia											
University of British Columbia	100	100	100	100	100	87	80	80	80	80	1
Alberta											
University of Alberta	130	130	130	130	130	90	90	90	90	90	2
Saskatchewan											
University of Saskatchewan	77	77	77	77	77	56	56	56	56	56	3
Manitoba											
University of Manitoba	55	55	55	55	55	45	45	45	45	45	4
Total Projected for Western Canada	362	362	362	362	362	278	278	278	278	278	

Source:

1. University of British Columbia
2. University of Alberta
3. Health Science Education Statistics (1981) Saskatchewan Continuing Education, Government of Saskatchewan
4. University of Manitoba

SECTION 9
TRAINING PROGRAMS FOR PHARMACISTS

9.0 WESTERN CANADA

There are four programs in Western Canada which train Pharmacists. In 1981, approximately 278 students a year graduate from these programs. (Note Exhibit 9.1)

9.1 BRITISH COLUMBIA

University of British Columbia

The University of British Columbia offers a four year program leading towards a Bachelor of Science in Pharmacy Degree. Students are required to take a pre-pharmacy year of courses through the Faculty of Science. After completing the pre-pharmacy year, and meeting the qualifications requirements of the faculty, students enter the first year of study.

The first year enrolment for 1981 was 100 students. The number of graduates estimated from the program is 86. These enrolment and graduate numbers are expected to continue. (Noe Exhibit 9.1)

9.2 ALBERTA

University of Alberta

The University of Alberta offers a Bachelor of Science in Pharmacy Degree. The program requires four years of course work.

The enrolment for this program in 1981 was 130 students. The graduation is estimated to average around 90 students per year over a five year period. The enrolment and graduation numbers fluctuate slightly but are expected to stay within the same range of 80 to 100 students. (Note Exhibit 9.1)

9.3 SASKATCHEWAN

University of Saskatchewan

A four year Bachelor of Science in the Pharmacy Degree is offered through the University of Saskatchewan.

In 1981, the enrolment for the program was 77 students. The number of students graduating each year is approximately 56 students. This number of enrolments and graduates is expected to continue. (Note Exhibit 9.1)

9.4 MANITOBA

University of Manitoba

A four year Bachelor of Science in Pharmacy Degree is available through the Faculty of Pharmacy at the University of Manitoba. Before qualifying to enter the program, students must complete a pre-pharmacy year of studies and therefore enter the pharmacy program in the second year.

The enrolment quota for the pharmacy program is 55. In the past, the actual enrolment has been slightly less. In 1981, 42 students graduated from the University of Manitoba Pharmacy Program. The number of graduates have fluctuated over the last few years. However, the average number of graduates is expected to be 45. (Note Exhibit 9.1)

EXHIBIT 10.1
TRAINING PROGRAM FOR PHYSIOTHERAPISTS IN WESTERN CANADA
PROJECTED NUMBER OF AVERAGE ENROLMENTS AND GRADUATES

Province and Institution	Projected Number of Average Enrolments and Graduates										Source
	Enrolments					Graduates					
	1981	1982	1983	1984	1985	1981	1982	1983	1984	1985	
British Columbia											
University of British Columbia	40*	40*	20*	20*	20*	28	28	28	28	28	1**
Alberta											
University of Alberta	40	40	40	40	40	35	35	35	35	35	2
Saskatchewan											
University of Saskatchewan	30	20	20	20	20	18	18	18	18	27	3
Manitoba											
University of Manitoba	22	22	22	22	22	20	20	20	20	20	4
Total Projected for Western Canada	132	122	122	122	122	101	101	101	101	110	

* These enrolments include students in the Combined Physical and Occupational Therapy Program at U.B.C., for 1981 and 1982. The 1983 to 1985 enrolments are projected on plans that the combined program will be split into two separate programs.

** Note: The graduation numbers as of 1987 are projected at 18.

1. University of British Columbia
2. Association of Chartered Physiotherapists of Alberta
3. University of Saskatchewan
4. University of Manitoba

SECTION 10
TRAINING PROGRAMS FOR PHYSIOTHERAPISTS

10.0 WESTERN CANADA

There are four programs in Western Canada which train physiotherapists. They graduate approximately about 101 students a year. (Note Exhibit 10.1)

10.1 BRITISH COLUMBIA

University of British Columbia

In British Columbia, training for physical therapy is available from the University of British Columbia (U.B.C.). The program at U.B.C. is a combined one in physical and occupational therapy. Students graduate with a Bachelor of Science Degree in Rehabilitation Medicine. As a pre-requisite to the program, students are required to have one year of course work from a university or college in the area of arts or sciences. The U.B.C. program in physical therapy is four years in length, when including the pre-requisite year.

The enrolment quota for 1981 was 40 students. Usually around 28 of the students graduating choose to work in the area of physiotherapy. (Note Exhibit 10.1)

Changes with the Combined Physical and Occupational Therapy program have been planned. The program will be split and two separate programs will be offered. Therefore, students will receive training either as a physical therapist or a occupational therapist. As a separate program, the enrolment quota for physical therapy will be approximately 20 students, with an anticipated graduation of 18 students. These two new programs are expected to be introduced by 1983.

10.2 ALBERTA

University of Alberta

The University of Albreta offers a four year Bachelor of Science Degree in Physical Therapy, from the Faculty of Rehabilitation Medicine.

In 1981, the enrolment quota was 40 with an estimated graduation of 35 students. These numbers are expected to continue. (Note Exhibit 10.1)

10.3 SASKATCHEWAN

University of Saskatchewan

The University of Saskatchewan offers a four year Bachelor of Science Degree in Physical Therapy. As a pre-requisite to the program, students are required to take a first year level of university course through either the Faculty of Arts or Science.

The enrolment in 1981 was 30. This was an increase from the regular quota of 20. The enrolment quota of 20 is expected to continue with 18 of the students graduating. (Note Exhibit 10.1)

In Saskatchewan, the Provincial government have awarded an average of 6 bursaries per year to students interested in pursuing an education in physical therapy. The total number of bursaries is expected to drop to 4 in the near future.

10.4 MANITOBA

University of Manitoba

The school of Medical Rehabilitation at the University of Manitoba offers a Bachelor of Medical Rehabilitation Degree (Physical Therapy). It is a four year program. Students entering the program must complete a pre-requisite year of course work through either the Arts or Science Faculty. After the pre-requisite year is completed,

students enter the second year of the Physical Therapy program.

In the past, the Physical Therapy program was a diploma program. The diploma program has been replaced by the degree program.

The Physical Therapy program enrols both new students and physiotherapists with a diploma qualifications who wish to upgrade their professional abilities and knowledge. The enrolment quota for new students is 22, of which 20 are expected to graduate. (Note Exhibit 10.1)

Therapists with diploma qualifications enter a one year program and obtain a Bachelor of Physical Therapy degree. Although there are no enrolment quotas for this program enrolment may be limited in some courses.

EXHIBIT 11.1
TRAINING PROGRAM FOR X-RAY TECHNOLOGISTS IN WESTERN CANADA
PROJECTED NUMBER OF AVERAGE ENROLMENTS AND GRADUATES

Province and Institution	Projected Number of Average Enrolments and Graduates										Source
	Enrolments					Graduates					
	1981	1982	1983	1984	1985	1981	1982	1983	1984	1985	
British Columbia											
B.C. Institute of Technology	51	51	51	51	51	44	44	44	44	44	1
Alberta											
North.Alta.Instit. of Technology	48	48	48	48	48	41	41	41	41	41	2
Saskatchewan											
Kelsey Institute	25	25	25	25	25	19	19	19	19	29	3
Manitoba											
Red River Community College	35	35	35	35	35	31	31	31	31	31	4
Total Projected for Western Canada	159	159	159	159	159	131	131	131	131	131	

Source:

1. British Columbia Institute of Technology
2. Northern Alberta Institute of Technology
3. Health Science Education Statistics, Saskatchewan Continuing Education
4. Red River Community College

SECTION 11
TRAINING PROGRAMS FOR X-RAY TECHNOLOGISTS

11.0 WESTERN CANADA

There are four Medical Radiography programs which train X-Ray Technologists in Western Canada. They graduate approximately 131 students. (Note Exhibit 11.1)

11.1 BRITISH COLUMBIA

British Columbia Institute of Technology

A Medical Radiography program is offered at the British Columbia Institute of Technology. It is an 18 month program.

The 1981 enrolment for the course was 51. The number of students graduating each year is approximately 44. These numbers for enrolment and graduation are not expected to change. (Note Exhibit 11.1)

11.2 ALBERTA

Northern Alberta Institute of Technology

In Alberta, the X-Ray Technologists receive training through a two year program offered jointly by the Northern Alberta Institute of Technology and the Radiology Departments of a number of affiliated hospitals.

The enrolment quota for 1981 was 48 with an estimated graduation of 41 students. These enrolment and graduation numbers are expected to remain constant. (Note Exhibit 11.1)

11.3 SASKATCHEWAN

Kelsey Institute

In Saskatchewan, students receive training in Medical Radiography through a two year program offered jointly by the Kelsey Institute and the Radiology Department of Affiliated Hospitals.

The 1981 enrolment for the program was 25. The number of students graduating each year is approximately 19. These enrolment and graduation numbers are expected to continue. (Note Exhibit 11.1)

11.4 MANITOBA

Red River Community College

A Medical Radiography program is offered at the Red River Community College. It is a two year program. The program is affiliated with a number of hospital in Manitoba.

In 1981 enrolment for the course was 35. The number of students graduating each year is approximately 27. These enrolment and graduation numbers are expected to remain constant. (Note Exhibit 11.1)

EXHIBIT 12.1
TRAINING PROGRAMS FOR RESPIRATORY TECHNOLOGISTS IN WESTERN CANADA
PROJECTED NUMBER OF AVERAGE ENROLMENTS AND GRADUATES

Province and Institution	Projected Number of Average Enrolments and Graduates										Source
	Enrolments					Graduates					
	1981	1982	1983	1984	1985	1981	1982	1983	1984	1985	
British Columbia											
Cariboo College	20	20	20	20	20	0	18*	18*	18*	18*	1
Alberta											
North.Alta.Instit. of Technology	36	36	36	36	36	30	30	30	30	30	2
South.Alta.Instit. of Technology	27	27	27	27	27	24	24	24	24	24	3
Manitoba											
Health Science Centre	20	20	20	20	20	16	16	16	16	16	4
Total Projected for Western Canada	103	103	103	103	103	70	88	88	88	88	

Source:

* The program started in 1979, therefore, the first graduating year is in 1982.

1. Cariboo College
2. Northern Alberta Institute of Technology
3. Southern Alberta Institute of Technology
4. Health Science Centre

TRAINING PROGRAMS FOR RESPIRATORY TECHNOLOGISTS

13.0 WESTERN CANADA

There are four programs for Respiratory Technologists in Western Canada. They will graduate approximately 88 students a year (Note Exhibit 12.1)

13.1 BRITISH COLUMBIA

Cariboo College

Cariboo College offers a three year program in Respiratory Technology. Students graduate as a Respiratory Technologist.

The enrolment quota for 1981 was 20 with an estimated graduation of 18 students. These enrolment and graduation numbers are expected to continue. (Note Exhibit 12.1)

13.2 ALBERTA

Alberta has two programs for Respiratory Technologists and graduate approximately 54 students a year.

Northern Alberta Institute of Technology

A two year Respiratory Technology program is offered at the Northern Alberta Institute of Technology.

The 1981 enrolment for the course was 36. The number of students graduating each year is approximately 30. These numbers for enrolment and graduation are not expected to change. (Note Exhibit 12.1)

Southern Alberta Institute of Technology

The Southern Alberta Institute of Technology offers a two year program in Respiratory Technology.

The enrolment quota for 1981 was 27 with an estimated graduation of 24 students. These enrolment and graduation numbers are expected to remain constant. (Note Exhibit 12.1)

13.3 SASKATCHEWAN

There is no formal training program for Respiratory Technologists in Saskatchewan.

13.4 MANITOBA

Health Sciences Centre

A Respiratory Technologists program is offered at the Health Science Centre in Manitoba. It is a two year program.

The 1981 enrolment for the course was 20 with an estimated graduation of 16 students. These enrolment and graduation numbers are expected to continue. (Note Exhibit 12.1)

Province of
British Columbia

Province of
Alberta

Province of
Saskatchewan

Province of
Manitoba

WESTERN CANADA
HEALTH MANPOWER TRAINING STUDY

Category # 3 Report X - A

AUDIOLOGIST

REPORT X-A

AUDIOLOGISTS

THE REQUIREMENT FOR ALTERNATIVE TRAINING AND FUNDING ARRANGEMENTS IN WESTERN CANADA

REPORT X-A

AUDIOLOGISTS

TABLE OF CONTENTS

PAGE

I. INTRODUCTION

Study Background.....1
Study Objectives.....1
Study Approach.....2
Occupation Definition.....4

II. TRAINING NEEDS IN WESTERN CANADA

Manpower Requirements.....5
Existing Training Program.....6
Occupational Issues.....7

III. TRAINING RESPONSES

Decision Process.....10
Timing and Location of Manpower Requirements.....10
Indicated Manpower Responses.....11

IV. RECOMMENDATIONS.....14

APPENDIX I - Study Approach and Methodology
APPENDIX II - Provincial Net Manpower Requirement
APPENDIX III - Scope of Practice
APPENDIX IV - Bibliography

I. INTRODUCTION

STUDY BACKGROUND

The provision of effective health services to the community is, to a considerable degree, dependent on three essential resources:

- o an adequate supply of well-trained specialist staff in each health occupation group
- o the development of adequate facilities to service the community
- o the availability of adequate funds to ensure cost-effective and efficient health services.

The range and complexity of health treatment programs has expanded greatly in Canada during the last twenty-five years. In addition, changing technology and the development of new treatment programs have resulted in an increased requirement for skilled, adequately trained health manpower. These factors have resulted in an increased emphasis on manpower planning and skill training for health occupations to ensure an adequate supply of trained practitioners to meet defined manpower requirements.

STUDY OBJECTIVES

The Western Canada Health Manpower Training Study was initiated by the western Premiers at their annual conference in 1980. The study terms of reference contain two major objectives. These are:

- o to assess the existing and future needs for health manpower training programs and facilities in western Canada

- to make recommendations for the rationalization of the location and funding of health manpower training programs and facilities in western Canada.

STUDY APPROACH

The study was under the direction of a Steering Committee consisting of health and education representatives from the Provinces of British Columbia, Alberta, Saskatchewan and Manitoba. The study took place over two years and consisted of a review of 26 health occupations grouped into five categories. Each occupation has been studied separately, and a report has been produced for each. In addition, a report examining the inter-relations of the occupations has been submitted to the Steering Committee.

Data was collected from provincial and national associations and from government agencies for each of the occupations on the numbers of individuals registered with the associations and their current status as active or inactive practitioners. An attempt was also made to gather data on historical trends, the number of graduates from training, trends in movement of active practitioners to inactive status, occupational shifts out of the profession, trends in migration to and from other provinces, and immigration and emigration.

In the cases where validated and reliable information was not available, association spokesmen, employers and individuals in each of the occupations were interviewed to provide qualitative opinions regarding present and future trends affecting the manpower supply and requirement.

A literature review was conducted to examine the problems facing the occupation. A bibliography of the material reviewed is contained in Appendix IV.

A health manpower computer model was developed to assist in the preparation of projections on the future supply and requirement for each occupation. A critical analysis of these twenty-year projections was then undertaken to develop the various supply and requirement scenarios presented in this report.

Separate documents describing the manpower planning methodology and the training decision-making process were issued. A brief summary of the overall study approach and methodology is set out in Appendix I and details of the provincial net requirements are set out in Appendix II.

OCCUPATION DEFINITION

This report addresses the need for training programs for audiologists in each of the four provinces. For the purpose of this study, an audiologist is defined as an individual who:

"provides diagnostic evaluation and rehabilitative services and conduct research related to hearing. Administers air and bone conduction and other audiometric tests and examinations to determine hearing efficiency. Co-ordinates audiometric results with medical, social, behavioural and other diagnostic data. Evaluates total response pattern and acoustic tests to differentiate between organic and non-organic hearing loss. Plans, directs and participates in counselling, speech-reading and other rehabilitation programs. Acts as consultants to educational, medical and other professional groups. Conducts research in physiology, pathology, biophysics and psychophysics of auditory system, if required. Designs and develops clinical and research procedures and apparatus, if required."[1]

1. Canadian Classification and Dictionary of Occupations, No. 3137-, 1980 Revision.

EXHIBIT 1: MANPOWER REQUIREMENTS

WESTERN CANADA: AUDIOLOGISTS

YEAR	PROJECTED STOCK	PROJECTED REQUIREMENT	
		POPULATION RATIO[1]	SERVICE TARGET RATIO[2]
1981	91	85	137
		Net -6	46
1982	97	86	141
		Net -11	44
1983	104	87	144
		Net -17	40
1984	113	90	147
		Net -23	34
1985	123	92	151
		Net -31	28
1990	168	101	164
		Net -67	-4
1995	206	108	177
		Net -98	-29
2000	238	116	192
		Net -122	-46

Note: 1- POPULATION RATIOS

British Columbia	1:72,863
Alberta	1:99,152
Saskatchewan	1:87,718
Manitoba	1:70,290

2- SERVICE TARGET RATIO
1:50,000

II - TRAINING NEEDS IN WESTERN CANADA

This section presents the statistical data for manpower requirements for western Canada, reviews the basis for projection and the confidence in basic data, existing training programs for audiologists, and reviews the major issues influencing the occupation.

MANPOWER REQUIREMENTS

Exhibit 1, opposite, shows the projected stock and requirement under two different scenarios for audiologists in western Canada during the period 1981 - 2000.

Methodology

Two scenarios have been established using different approaches to determine manpower requirements. The first uses a constant 1980 provincial population ratio for each of the western provinces. This approach assumes that each of the western provinces will require the same number of audiologists per population as in 1980. Using this approach the net manpower situation for audiologists in western Canada indicates a surplus of 122 audiologists by the year 2000.

The second approach used to determine requirements uses a service target ratio. This approach identifies a ratio of 1 audiologist to 50,000 population as a reasonable requirement level to reach by the year 2000. (The basis for this service target is discussed in more detail in Appendix II.)

Under the service target approach there is a potential surplus of 46 audiologists in western Canada by the year 2000.

The service target approach of 1:50,000, under a medium population growth has been determined as the most likely scenario. This ratio is seen as an optimum ratio and does not necessarily reflect the current situation. Training recommendations for this scenario were developed to reach a relative balance between the supply and requirements of audiologists by the year 2000.

Degree of Confidence

The projected stock has been developed on the basis of historical patterns and estimates of immigration, migration and occupational shift, current and projected levels of training and projected attrition from retirement at the age of 65.

The information for these projections have been derived from association records and estimates and government data. In general, the information contained in these records has a reasonable level of accuracy and the projections for audiologists are considered acceptable from the point of view of forecasting.

EXISTING TRAINING PROGRAM

There is one program which provides training in western Canada for audiologists. This program is offered through the University of British Columbia. The program is at the graduate level and combines training for audiologists and speech pathologists. The combined enrolment for the program in 1981 was 15 students. The University of British Columbia has indicated that the enrolment will be doubled to a combined intake of 30 by the year 1982. Of these enrolments between 6 to 10 students are expected to graduate as audiologists. The most likely scenario has been developed on the assumption of 8 students graduating in audiology. Both the provinces of

Saskatchewan and Manitoba grant an average of 1 bursary a year to students wishing to pursue studies in audiology.

For a more detailed discussion of these training programs, please refer to Report 3-A, "The Scope of Existing Training Programs - Category III, Occupations".

OCCUPATIONAL ISSUES

Historical and Current Trends

o Developing Role

- Audiology services have traditionally concentrated on testing, assessment and treatment. Other services have been identified by the profession as potential future growth areas. These include screening, prevention, additional follow-up with individuals and further assistance in areas such as utilizing residual hearing.

- The growing elderly population will increase the demand for audiology services.

o Use of Technicians

- In their work, some audiologists have developed a practice pattern which utilizes the assistance of technicians. Technicians are usually trained on the job and assist the audiologist with examinations, and use of equipment. Should the recruitment of individuals to these positions become difficult, the effect would

impact the level of services provided by the audiologist or the number of audiologists required to produce the same level of service.

o Proportion of Female Practitioners

. Currently, it is estimated that approximately 86% of active audiologists and speech pathologists are female. On average, a higher proportion of males are in audiology professions than in speech pathology professions. These trends are expected to continue.

o Pattern of Employment

. Based on survey data from the province of Alberta, it is estimated that approximately 90% of audiologists work full time. Limited information is available on the number of part-time hours worked per week, therefore the calculation of full time equivalent practitioners has not been attempted. Actual requirements for audiologists are slightly greater if ratios between part-time and full time participation are taken into consideration.

Situations Likely to Occur with Major Policy Changes

o Clarification of Role

. In western Canada, hearing aid dealers supply and service hearing aides. The public has experienced some confusion between the role of hearing aid dealers and audiologists. Within the profession there has been discussion on who should administer hearing aids.

If government policy changed to restrict the role of the hearing aid dealer, the requirement for audiologists would increase.

- Expanding Role

  - The awareness of occupational health and safety issues is increasing. If government and industry emphasize the requirement for audiology services in industry, the demand for audiologists would increase.

EXHIBIT 2

NET MANPOWER REQUIREMENTS BY PROVINCE

OCCUPATIONAL: AUDIOLOGISTS

EAR	BRITISH COLUMBIA		ALBERTA		SASKATCHEWAN		MANITOBA	
	POPULATION RATIO[1]	SERVICE TARGET[2]	POPULATION RATIO[1]	SERVICE TARGET[2]	POPULATION RATIO[1]	SERVICE TARGET[2]	POPULATION RATIO[1]	SERVICE TARGET[2]
981	-4	12	1	22	-1	8	-2	4
982	-9	9	1	23	-1	8	-2	4
983	-13	5	1	25	-2	7	-3	3
984	-20	-2	1	25	-1	7	-3	4
985	-27	-9	2	27	-2	7	-4	3
990	-62	-42	3	31	-3	6	-5	1
995	-90	-69	4	35	-4	6	-8	-1
000	-115	-92	4	39	-2	9	-9	-2

TE: 1- POPULATION RATIOS

British Columbia	1:72,863
Alberta	1:99,152
Saskatchewan	1:87,718
Manitoba	1:70,290

2- SERVICE TARGET RATIO
1:50,000

III - TRAINING RESPONSES

DECISION PROCESS

The decision process outlined in Appendix I and discussed in detail in Report C, "A Decision Process To Evaluate the Location of, and Funding Arrangements For Health Occupation Training Programs in Western Canada". was used to evaluate the training implications of the net manpower requirements for audiologists discussed above. This section contains the results of this analysis.

TIMING AND LOCATION OF MANPOWER REQUIREMENTS

Exhibit II, opposite, shows the projected net manpower requirements for audiologists in each of the western provinces for the period 1981 - 2000. The projections are developed on both a constant 1980 provincial population ratio and a service target ratio of 1:50,000. The most likely scenario for audiologists has been determined using the service target ratio approach.

- British Columbia

  Under the 1980 population ratio, British Columbia develops a surplus of 62 audiologists by 1990 and a surplus of 115 audiologists by the year 2000. This approximates to an average annual surplus of 6 audiologists a year. The future supply is based on the assumption that the majority of the graduates from the audiology program enter the British Columbia labour market. Under the service target ratio approach the surplus is 92 audiologists by the year 2000.

o Alberta

In Alberta, using the population ratio approach a requirement for 4 audiologists is indicated by the year 2000. Under the service target approach the requirement increases to a need for 39 additional audiologists in Alberta by the year 2000.

o Saskatchewan

In Saskatchewan, using the population ratio approach, there is a surplus of 2 audiologists by the year 2000. Under the service target ratio, there is a requirement for 9 additional audiologists by the year 2000.

o Manitoba

In Manitoba, using the population ratio approach, there is a surplus of 9 audiologists by the year 2000. This changes to a surplus of 2 audiologists under the service target approach.

INDICATED MANPOWER RESPONSES

Training is seen as an appropriate response to establishing a relative balance situation between the supply and requirement of audiologists in western Canada by the year 2000.

The net manpower requirements projected using the 1980 provincial population ratios indicates a surplus in British Columbia and a requirement in Alberta, and surplus in Saskatchewan and Manitoba. Based on this approach training recommendations would result in a reduction in the number of audiology graduates from the British Columbia, Speech and Audiology Program. Currently, however, British Columbia audiology training is combined with the speech pathology training. As a result, quotas are not formally established

for the number of students choosing to specialize in audiology. The decision on the area of speciality is made by the student in the second year of the program. Therefore, if there is to be more control over the number of audiologists entering the workforce, the University of British Columbia should establish some controls over the number of students specializing in audiology.

The manpower requirements based on the service target approach identifies a different situation with a smaller surplus in British Columbia and Manitoba by the year 2000, an increased requirement in Alberta and requirement also in Saskatchewan. The training response based on the service target ratio approach continues the concept of centralized, regional training for audiologists in Western Canada, through the University of British Columbia program in Speech and Audiology. The provinces sending students to the University of British Columbia should contract for places in the program and provide bursaries to students for studies in audiology. An effective mechanism should also be established to control the number of audiology graduates from the program.

Defined Alternative Locations

British Columbia is the only province in western Canada which has a training program for audiologists. Currently no other provinces contract for places in the University of British Columbia program. Both Saskatchewan and Manitoba have bursaries available for studies in audiology. Students securing these bursaries pursue studies in both Canada and the U.S.A. In the development of recommendations for this study, preference is given to training students in Canadian programs. This situation, however, is not always appropriate. In Manitoba, historically the rate of return of students trained in U.S.A. programs has been higher than those trained in Canadian programs. As a result, training alternatives for audiologists in Manitoba include the option to study at the University of British Columbia, Speech and Audiology program or at a preferred alternative location.

Review of Funding Arrangements

The University of British Columbia is considered to be the appropriate location for the training of audiologists for the provinces of British Columbia, Alberta and Saskatchewan. As a result, the provinces of Alberta and Saskatchewan should enter bilateral training agreements with the government of British Columbia. Specifically, Alberta should contract 2 places annually and Saskatchewan contract 1 place annually. Each of these provinces should share in the ongoing operational and administrative overhead costs of the program based on the proportion of training places contracted. Program development, start-up and capital costs would be excluded from these training agreements on the basis that the program is already in existence.

Defined Length of Training Agreement

The province of Alberta and Saskatchewan should establish formal training agreements with the Government of British Columbia for an initial five year period, with subsequent renewal options for additional five year periods.

IV - RECOMMENDATIONS

Recommendations for each of the four provinces are set out below.

- British Columbia

.1- That the University of British Columbia establish a mechanism to control the number of students specializing as an audiologist from the Speech and Audiology Program.

.2- That, as of 1983, a quota of between 6 to 8 students enter the University of British Columbia, Speech and Audiology Program in the speciality of audiology.

- Alberta

.3- That the Province of Alberta contract 2 places annually in the University of British Columbia, Speech and Audiology Program.

.4- That the Province of Alberta share the ongoing operational and administrative overhead costs based on the proportion of students entering the University of British Columbia, Speech and Audiology Program.

.5- That the Province of Alberta provide 2 bursaries a year toward studies in the University of British Columbia, Speech and Audiology program.

.6- That the training contract be established for a minimum period of five years with options for further five year periods.

- Saskatchewan

.7- That the Government of Saskatchewan contract 1 place annually in the University of British Columbia, Speech and Audiology Program.

.8- That the Province of Saskatchewan share ongoing operational and administrative overhead costs based on the proportion of students entering the University of British Columbia, Speech and Audiology Program.

.9- That the Province of Saskatchewan continue to make available 1 bursary a year for studies in audiology, and that the bursary be awarded to students enrolling in the University of British Columbia, Speech and Audiology program.

.10- That the training contract be established for a minimum period of five years with options for further five year periods.

- Manitoba

.11- That the Province of Manitoba continue to have 1 bursary available to students for studies in audiology.

.12- That the Province of Manitoba review the advantages of contracting for training places in the University of British Columbia, Speech and Audiology program in preference to programs in other locations, and that, if it is considered that this provides the best alternative, that the province of Manitoba enter into a formal training agreement with the Province of British Columbia to secure places in the program.

APPENDIX I

STUDY APPROACH AND METHODOLOGY

STUDY APPROACH

Introduction

In order to achieve the study objectives, the work program consists of three key activities. These are:

- the analysis of manpower supply and requirements, and the calculation of net manpower requirements
- the analysis of existing training programs for Western Canada
- the development of recommendations for alternative training locations and funding arrangements

Analysis of Manpower Supply and Requirements

The analysis of manpower supply and requirements is designed to allow for a variety of data inputs, and for different emphasis depending on the occupation under review. A variety of data sources are used including provincial and national associations, health insurance agencies, and provincial health and education departments. In all instances, data is developed independently of previously published sources.

In addition to the basic projection of net manpower requirements, a number of sensitivity analyses have been completed to assess the impact of changed in the factors affecting supply and requirements, prior to developing recommendations for either additional training programs, or expanding existing training programs.

Approaches to Determining Manpower Requirements

The approach developed to determine manpower requirements uses three methods of projection. These are discussed below.

1. Service Utilization Approach

The utilization approach is based on an analysis of the pattern of health service usage. It establishes trends in service utilization and projects these onto future population estimates. There are three steps in the service utilization approach.

Step 1 - Determine Per Capita Utilization Rate

Historical data of the number of services provided, by age and sex of recipient is derived. The number of services per age/sex group is then divided by the population for group in the corresponding year. This results in a per capita utilization rate.

Step 2 - Project Future Service Required

The per capita utilization rate is projected onto the low, medium and high population for each year from 1981 to 2000. This results in an estimate of total future services.

Step 3 - Estimated Number of Practitioners Required

Having determined the total future services, the model projects the number of practitioners required, by assuming a constant level of services per practitioner. The number of services per practitioner is determined by dividing total services by the number of practitioners in the base year. To estimate the required number of practitioners, the model divides total future services required by the number of services per practitioner.

2. Service Target Ratio Approach

Service target ratios reflect a theorectical optimal manpower level required to meet health service requirements in the occupation under review. They are expressed as the ratio of practitioner to population. The service target ratios are derived based on discussion with health authorities, review of published reports, articles and summary of defined health care needs.

3. Population Ratio Approach

Population ratios are derived by dividing the total population at a specific point in time by the number of active practitioners. This results in a ratio of practitioners to population.

These ratios are analysed to determine if any trends exists. to project futuren manpower requirements, the model divides total projected population by the previously determined population ratio.

Summary of Approaches to Projecting Manpower Requirements

The three approaches outlined above have been used for the calculation of manpower requirements for this occupation. The specific application of each approach to this occupation is discussed under General Assumption, Appendix II, following.

Development of Recommendations for Alternative Training Locations and Funding Arrangements

We have developed a decision process to assist in developing recommendations for alternative training location(s) and funding arrangements. This process is designed to allow for the logical, consistent evaluation of a range of training alternatives.

There are seven steps in the decision process:

. Step 1. Analysis of manpower requirements

. Step 2. Identification of the appropriate type(s) of training

. Step 3. Definition of alternative training locations

. Step 4. Evaluation of alternative locations for new programs

. Step 5. Establishment of timing of training program requirement

. Step 6. Recommendation on training action(s) and location(s)

. Step 7. Recommendation on funding alternative(s)

LABOUR MARKET SUPPLY

Labour market supply is the relationship between the estimated number of practitioners registered with the provincial associations, the number of practitioners actually employed and the number of vacant positions. Vacancy survey data (normally collected by provincial governments) will identify the total number of budgeted positions, which is the total of the number currently employed plus vacancies.

Labour market supply is a useful tool to estimate, or determine the employment situation for each occupation. The current supply situation is expressed as total budgeted positions divided by the total number of registered practitioners. This percentage (%) of qualified practitioners who are currently employed will indicate the flexability of the existing labour market.

Typically the flexability of the labour market will reflect vacancy rates. The following table illustrates theoretical labour market situations:

"Tight" labour market - 90% - 95% of practitioners actively employed with a vacancy rate of 12% to 20%.

"Balanced" Labour Market - 80% - 90% of practitioners actively employed with a vacancy rate of 8% to 12%.

"Loose" Labour Market - 70% - 80% of practitioners actively employed with a vacancy rate of 0% to 8%.

APPENDIX II

PROVINCIAL NET MANPOWER REQUIREMENTS

TABLE X.0.1

NUMBER OF PRACTITIONERS BY PROVINCE IN WESTERN CANADA

OCCUPATION: AUDIOLOGISTS

YEAR	BRITISH COLUMBIA[1]	ALBERTA[2]	SASKATCHEWAN[3]	MANITOBA[4]
1977	19	16	10	7
1978	-	16	11	11
1979	-	20	11	12
1980	36	21	11	15

SOURCE:

1 DATA 1977
DIVISION OF HEALTH SERVICES RESEARCH AND DEVELOPMENT, INFORMATION TAKEN FROM ROLL CALL '77.

DATA 1980
ESTIMATE BASED ON REPORT R: 11, HEALTH MANPOWER RESEARCH UNIT (H.M.R.U.), DIVISION OF HEALTH SERVICES RESEARCH AND DEVELOPMENT, HEALTH SERVICES CENTER, UNIVERSITY OF BRITISH COLUMBIA

2 SPEECH AND HEARING ASSOCIATION OF ALBERTA (S.S.H.A.)

3 SASKATCHEWAN SPEECH AND HEARING ASSOCIATION (S.S.H.A.)

4 MANITOBA SPEECH AND HEARING ASSOCIATION (M.S.H.A.), GOVERNMENT OF MANITOBA, HEALTH MANPOWER PROVINCIAL REPORT, MANITOBA

NOTE:

FOR ALL PROVINCES THE DATA IS AN ESTIMATE OF ACTIVE AUDIOLOGISTS.

Table X.0.2

Factors Affecting Manpower Supply in Western Canada

Occupation: AUDIOLOGISTS

Factor	British Columbia	Alberta
Opening Stock	36	21
Net Migration	1 for all years	1 every 2nd year
Net Immigration	1 for all years	1 for all years
Net Occupation Shift	-3% of opening stock	-3% of opening stock
Training Output	4 for 1981-1983 8 for 1984 - 2000	0 for all years
Attrition	Actual Retirement	Actual Retirement

	Saskatchewan	Manitoba
Opening Stock	11	15
Net Migration	-1 every 2nd year	-1 every 2nd year
Net Immigration	Zero for all years	1 for all years
Net Occupation Shift	-3% of opening stock	-3% of opening stock
Training Output	1 for all years	1 for all years
Attrition	Actual Retirement	Actual Retirement

GENERAL ASSUMPTIONS

Manpower Stock

Table X.0.1, opposite, illustrates the total number of active audiologists identified in each of the provinces in Western Canada.

Factors Affecting Manpower Supply

The assumptions made with respect to each of the factors which have the potential to affect manpower stock are shown opposite in Table X.0.2. These factors include migration, immigration, training output, active/inactive movement and retirement through attrition. For each of these assumptions, the information source has been identified. Assumptions affecting manpower have been based on historical and current information along with projected trends.

Estimating Requirements

- Historical Ratio

  For each province, the current ratio of audiologists to population was used to project the number of practitioners required in the future to maintain to current level of manpower.

- Utilization

  The utilization approach was not used to determine net manpower requirements for audiologists. Utilization data for audiologists is not age specific, therefore, it does not provide an accurate utilization pattern of services related to the changing proportion of population age groups.

o Service Target Ratio

The service target ratio of 1 audiologist to 50,000 people was developed by the American Speech and Hearing Association during the early 1970's. The ratio has been accepted by the profession and health care industry as an optimum number of audiologists to service the needs of a population. Within the profession there has been discussion that the factors and needs in developing the 1 to 50,000 ratio have changed in the last 10 years, therefore, indicating a lower population ratio. No alternative ratio has yet been developed.

Sensitivity Analysis

An alternative service target ratio of 1:25,000 audiologists has been suggested by some members of the profession. A sensitivity analysis was implemented determining the effect on net requirements. In British Columbia, a relative balance situation would occur. In Alberta and Saskatchewan the requirement would triple and in Manitoba the surplus noted under the most likely scenario would change to a requirement for double the audiologists projected for the year 2000.

TABLE X.1.1

PROVINCE: BRITISH COLUMBIA
OCCUPATION: AUDIOLOGISTS

YEAR	NUMBER OF PRACTITIONERS	POPULATION TO MANPOWER
1977	19	1:131210
1978	-	-
1979	-	-
1980	36	1: 72860

SOURCE:

DATA 1977
DIVISION OF HEALTH SERVICES RESEARCH AND DEVELOPMENT, INFORMATION TAKEN FROM ROLL CALL '77.

DATA 1980
REPORT R:11, HEALTH MANPOWER RESEARCH UNIT (H.M.R.U.), DIVISION OF HEALTH SERVICES RESEARCH AND DEVELOPMENT, UNIVERSITY OF BRITISH COLUMBIA. THE DATA IS AN ESTIMATE OF ACTIVE AUDIOLOGISTS.

BRITISH COLUMBIA SPEECH AND HEARING ASSOCIATION (B.C.S.H.A.)

Table X.1.2

Factors Affecting Manpower Supply

Province: BRITISH COLUMBIA
Occupation: AUDIOLOGISTS

Factor	Assumption	Source
Opening Stock	36	H.M.R.U. & B.C.S.H.A.[2]
Net Migration	1 for all years	H.M.R.U. & B.C.S.H.A.[2]
Net Immigration	1 for all years	H.M.R.U. & B.C.S.H.A.[2]
Net Occupational Shift[1]	-3% of opening stock	ESTIMATE[3]
Training Output	4 for 1981-1983 8 for 1984 - 2000	U. OF B.C.[4]
Attrition	Actual Retirement	H.M.R.U. & B.C.S.H.A.[2]

NOTES:

[1] INCLUDES ACTIVE/INACTIVE FLOWS

[2] ESTIMATES FROM REPORT R:__, HEALTH MANPOWER RESEARCH UNIT (H.M.R.U.), DIVISION OF HEALTH SERVICES RESEARCH AND DEVELOPMENT, UNIVERSITY OF BRITISH COLUMBIA

BRITISH COLUMBIA SPEECH AND HEARING ASSOCIATION (B.C.S.H.A.)

[3] ESTIMATE, DETERMINED FROM RESEARCH ON THE OCCUPATION

[4] UNIVERSITY OF BRITISH COLUMBIA

TABLE X.1.3

SPEECH PATHOLOGISTS AND AUDIOLOGISTS
IN BRITISH COLUMBIA BY AGE

AGE GROUP	MALE	FEMALE	TOTAL
Less than 26	-	30	30
26 - 35	-	181	181
36 - 45	-	52	52
46 - 55	-	11	11
More than 56	-	9	9
TOTAL	-	283	283

Source: Estimates based on percentage of active and inactive practitioners who are members of the B.C. Speech and Hearing Association and proportion in each age group based on age distribution of respondents in Report R:11, prepared by Health Manpower Research Unit.

PROVINCIAL ASSUMPTIONS

BRITISH COLUMBIA

a) Legal Controls

There is no legislation controlling the right to practice.

b) Assumptions

Table X.1.1, opposite, indicates the total number of audiologists in British Columbia identified as active.

o Factors Affecting Manpower Supply

The assumptions made with respect to each of the factors which have the potential to affect manpower supply are shown in Table X.1.2, opposite. These factors include migration, immigration, active to inactive movements, training output and retirement. For each assumption, the information source has been identified. The age distribution for Speech Pathologists and Audiologists is shown in Table X.1.3.

o Confidence in Factors Affecting Manpower Supply

The assumptions made on manpower supply for audiologists were developed from information published in Report R:11, through the Health Manpower Research Unit (HMRU) and from estimates made by the association.

Because of the small numbers of audiologists, the active stock is considered to be fairly accurate. No records are kept on the movements from migration, immigration or from active to inactive, therefore assumptions were developed on estimates. The active to inactive

TABLE X.1.4

MANPOWER REQUIREMENTS

BRITISH COLUMBIA
OCCUPATION: AUDIOLOGY

YEAR	PROJECTED STOCK	PROJECTED REQUIREMENT	
		POPULATION RATIO[1]	SERVICE TARGET RATIO[2]
1981	41	37	53
		Net -4	12
1982	46	37	55
		Net -9	9
1983	51	38	56
		Net -13	5
1984	59	39	57
		Net -20	-2
1985	67	40	58
		Net -27	-9
1990	105	43	63
		Net -62	-42
1995	137	47	68
		Net -90	-69
2000	165	50	73
		Net -115	-92

Note: 1- POPULATION RATIO
1:72,863

2- SERVICE TARGET RATIO
1:50,000

estimates are based on a minimal movement of -3%. The training figures assume that the majority of graduates enter the British Columbia work force and that the size of the program will increase by 1982. This information was obtained from the University of British Columbia. Specific age distributions are not kept for audiologists through the association. Estimates indicate that the majority of audiologists are under 45 years of age, therefore, when considering retirement at 65, no retirements are expected to occur during the 20 year period.

o Estimating Requirements

. Historical Ratio

The current British Columbia ratio of 1 audiologist to 72,863 population, was used to project the number of audiologists required in the future to maintain the current level of manpower.

. Service Target Ratio

The service target ratio of 1 audiologist to 50,000 population, was used to determine a reasonable requirement level of audiologists to attain by the year 2000.

o Net Manpower Requirement

The net manpower requirements under each projection approach are shown in Table X.1.4, opposite. The most likely scenario is based on a service target ratio of 1:50,000 under the medium population projection.

Table X.2.1

Province: ALBERTA
Occupation: AUDIOLOGISTS

Year	Number of Practitioners	Population to Manpower
1977	16	1:118530
1978	16	1:122010
1979	20	1:100930
1980	21	1: 99150

Source: SPEECH AND HEARING ASSOCIATION OF ALBERTA (S.H.A.A.)

THE DATA IS AN ESTIMATE OF ACTIVE AUDIOLOGISTS

Table X.2.2

Factors Affecting Manpower Supply

Province: ALBERTA
Occupation: AUDIOLOGISTS

Factor	Assumption	Source
Opening Stock	21	S.H.A.A.[2]
Net Migration	1 every 2nd year	S.H.A.A.[2]
Net Immigration	1 for all years	S.H.A.A.[2]
Net Occupational Shift[1]	-3% of opening stock	ESTIMATE[3]
Training Output	0 for all years	ESTIMATE[4]
Attrition	Actual Retirement	ESTIMATE[5]

Notes:

[1] Includes Active/Inactive Flows

[2] SPEECH AND HEARING ASSOCIATION OF ALBERTA (S.H.A.A.)

[3] ESTIMATE, DETERMINED FROM RESEARCH ON THE OCCUPATION

[4] ESTIMATE, NO RECORDS ARE KEPT ON THE NUMBER OF ALBERTANS PURSUING STUDIES IN AUDIOLOGY

[5] ESTIMATES, MADE BY THE S.H.A.A., NO RECORDS ARE KEPT ON AGE DISTRIBUTION

PROVINCIAL ASSUMPTIONS

ALBERTA

a) Legal Controls

There is no legislation controlling the right to practice.

b) Assumptions

Table X.2.1, opposite, indicates the total number of audiologists in Alberta identified as active.

o Factors Affecting Manpower Supply

The assumptions made with respect to each of the factors which have the potential to affect manpower supply are shown in Table X.2.2, opposite. These factors include migration, immigration, active to inactive movements, training output and retirement. For each assumption, the information source has been identified.

o Confidence in Factors Affecting Manpower Supply

The assumptions made on manpower supply for audiologists were developed from estimates made by the association. The active stock includes both audiologists in the association and an estimate of the audiologists who are not members of the association. No records are kept on the movements from migration, immigration or from active to inactive, therefore the assumptions were developed on estimates made by the association. The active to inactive movement estimates are based on a minimal movement of -3%.

Specific age distributions are not kept for audiologists through the association. Estimates indicate that the majority of audiologists are currently under the age of 45 years, therefore no retirements are expected during the 20 year period.

TABLE X.2.4

MANPOWER REQUIREMENTS

ALBERTA
OCCUPATION: AUDIOLOGY

YEAR	PROJECTED STOCK	PROJECTED REQUIREMENT	
		POPULATION RATIO[1]	SERVICE TARGET RATIO[2]
1981	21	22	43
		Net 1	22
1982	22	23	45
		Net 1	23
1983	22	23	47
		Net 1	25
1984	23	24	48
		Net 1	25
1985	23	25	50
		Net 2	27
1990	26	29	57
		Net 3	31
1995	28	32	63
		Net 4	35
2000	31	35	70
		Net 4	39

Note: 1- POPULATION RATIO
1:99,152

2- SERVICE TARGET RATIO
1:50,000

- Estimating Requirements

  - Historical Ratio

    The current Alberta ratio of 1 audiologist to 99,152 population, was used to project the number of audiologists required in the future to maintain the current level of manpower.

  - Service Target Ratio

    The service target ratio of 1 audiologist to 50,000 population, was used to determine a reasonable requirement level of audiologists to attain by the year 2000.

- Net Manpower Requirement

The net manpower requirements under each projection approach are shown in Table X.2.4, opposite. The most likely scenario is based on a service target ratio of 1:50,000 under the medium population projection.

Table X.3.1

Province: SASKATCHEWAN
Occupation: AUDIOLOGISTS

Year	Number of Practitioners	Population to Manpower
1977	10	1: 93720
1978	11	1: 86150
1979	11	1: 86900
1980	11	1: 87720

Source: SASKATCHEWAN SPEECH AND HEARING ASSOCIATION (S.S.H.A.)

THE DATA IS AN ESTIMATE OF ACTIVE AUDIOLOGISTS

Table X.3.2

Factors Affecting Manpower Supply

Province: SASKATCHEWAN
Occupation: AUDIOLOGISTS

Factor	Assumption	Source
Opening Stock	11	S.S.H.A.[2]
Net Migration	-1 every 2nd year	S.S.H.A.[2]
Net Immigration	Zero for all years	S.S.H.A.[2]
Net Occupational Shift[1]	-3% of opening stock	ESTIMATE[3]
Training Output	1 for all years	GOVERNMENT OF SASKATCHEWAN[4]
Attrition	Actual Retirement	S.S.H.A.

Notes:

[1] Includes Active/Inactive Flows

[2] SASKATCHEWAN SPEECH AND HEARING ASSOCIATION (S.S.H.A.)

[3] ESTIMATE, DETERMINED FROM RESEARCH ON THE OCCUPATION

[4] GOVERNMENT OF SASKATCHEWAN, THE AVERAGE NUMBER OF BURSARIES GRANTED FOR STUDIES IN AUDIOLOGY

TABLE X.3.3

SPEECH PATHOLOGISTS AND AUDIOLOGISTS
IN SASKATCHEWAN BY AGE

AGE GROUP	MALE	FEMALE	TOTAL
20 - 24	-	-	3
25 - 29	-	-	15
30 - 34	-	-	20
40 - 44	-	-	3
45 and over	-	-	7
Unknown	-	-	-
TOTAL	-	-	53

Source: The Saskatchewan Speech and Hearing Association.

PROVINCIAL ASSUMPTIONS

SASKATCHEWAN

a) Legal Controls

There is no legislation controlling the right to practice.

b) Assumptions

Table X.3.1, opposite, indicates the total number of audiologists in Saskatchewan identified as active.

o Factors Affecting Manpower Supply

The assumptions made with respect to each of the factors which have the potential to affect manpower supply are shown in Table X.3.2, opposite. These factors include migration, immigration, active to inactive movements, training output and retirement. For each assumption, the information source has been identified. The age distribution for Speech Pathologists and Audiologists is shown in Table X.3.3.

o Confidence in Factors Affecting Manpower Supply

The assumptions made on manpower supply for audiologists were developed from estimates made by the association. The active stock includes both audiologists in the association and an estimate of the audiologists who are not members of the association. No records are kept on the movements from migration, immigration or from active to inactive, therefore the assumptions were developed on estimates made by the association. The active to inactive movement estimates are based on a minimal movement of -3%.

Traditionally the Government of Saskatchewan has granted 1 bursary a year towards studies in audiology. This is included under training output. The attrition from retirement has been estimated on actual age distributions kept by the association.

TABLE X.3-4

MANPOWER REQUIREMENTS

SASKATCHEWAN
OCCUPATION: AUDIOLOGY

YEAR	PROJECTED STOCK	PROJECTED REQUIREMENT		
		POPULATION RATIO[1]		SERVICE TARGET RATIO[2]
1981	12		11	20
		Net	-1	8
1982	12		11	20
		Net	-1	8
1983	13		11	20
		Net	-2	7
1984	13		12	20
		Net	-1	7
1985	14		12	21
		Net	-2	7
1990	16		13	22
		Net	-3	6
1995	17		13	23
		Net	-4	6
2000	16		14	25
		Net	-2	9

Note: 1- POPULATION RATIO
1:87,718

2- SERVICE TARGET RATIO
1:50,000

o Estimating Requirements

. Historical Ratio

The current Saskatchewan ratio of 1 audiologist to 87,718 population, was used to project the number of audiologists required in the future to maintain the current level of manpower.

. Service Target Ratio

The service target ratio of 1 audiologist to 50,000 population, was used to determine a reasonable requirement level of audiologists to attain by the year 2000.

o Net Manpower Requirement

The net manpower requirements under each projection approach are shown in Table X.3.4, opposite. The most likely scenario is based on a service target ratio of 1:50,000 under the medium population projection.

Table X.4.1

Province: MANITOBA
Occupation: AUDIOLOGISTS

Year	Number of Practitioners	Population to Manpower
1977	7	1:147010
1978	11	1: 93900
1979	12	1: 87230
1980	15	1: 70290

Source: MANITOBA SPEECH AND HEARING ASSOCIATION (M.S.H.A.)

GOVERNMENT OF MANITOBA, HEALTH MANPOWER PROVINCIAL REPORT MANITOBA, 1980

THE DATA IS AN ESTIMATE OF ACTIVE AUDIOLOGISTS

Table X.4.2

Factors Affecting Manpower Supply

Province: MANITOBA
Occupation: AUDIOLOGISTS

Factor	Assumption	Source
Opening Stock	15	M.S.H.A.[2] GOVERNMENT OF MANITOBA[3]
Net Migration	-1 every 2nd year	M.S.H.A.[2]
Net Immigration	1 for all years	M.S.H.A.[2]
Net Occupational Shift[1]	-3% of opening stock	ESTIMATE[4]
Training Output	1 for all years	GOVERNMENT OF MANITOBA[5]
Attrition	Actual Retirement	M.S.H.A.[2]

Notes:

[1] Includes Active/Inactive Flows

[2] MANITOBA SPEECH AND HEARING ASSOCIATION (M.S.H.A.)

[3] GOVERNMENT OF MANITOBA, HEALTH MANPOWER PROVINCIAL REPORT MANITOBA, 1980

[4] ESTIMATE, DETERMINED FROM RESEARCH ON THE OCCUPATION

[5] GOVERNMENT OF MANITOBA, THE AVERAGE NUMBER OF BURSARIES GRANTED FOR STUDIES IN AUDIOLOGY

TABLE X.4.3

SPEECH PATHOLOGISTS AND AUDIOLOGISTS
IN MANITOBA BY AGE

AGE GROUP	MALE	FEMALE	TOTAL
20 - 24	-	11	11
25 - 29	6	48	54
30 - 34	6	15	21
35 - 39	6	17	23
40 - 44	1	3	4
45 - 49	-	3	3
50 - 54	-	6	6
55 - 59	-	1	1
60 - 64	-	-	-
65 and over	-	-	-
Unknown	-	-	-
TOTAL	19	104	123

Source: The Manitoba Speech and Hearing Association

PROVINCIAL ASSUMPTIONS

MANITOBA

a) Legal Controls

An Act Respecting the Practice of Speech and Hearing Therapy (Cap 105, 1961) is the act regulating the practice of audiologists in the province of Manitoba. The certification and licensing requirements are shown in Appendix III - Scope and Control of Practice.

b) Assumptions

Table X.4.1, opposite, indicates the total number of audiologists in Manitoba identified as active.

o Factors Affecting Manpower Supply

The assumptions made with respect to each of the factors which have the potential to affect manpower supply are shown in Table X.4.2, opposite. These factors include migration, immigration, active to inactive movements, training output and retirement. For each assumption, the information source has been identified. The age distribution for Speech Pathologists and Audiologists is shown in Table X.4.3.

o Confidence in Factors Affecting Manpower Supply

The assumptions made on manpower supply for audiologists were developed from estimates made by the association. The active stock includes both audiologists in the association and an estimate of the audiologists who are not members of the association. No records are kept on the movements from migration, immigration or from active to inactive, therefore the assumptions were developed on estimates made by the association. The active to inactive movement estimates are based on a minimal movement of -3%.

TABLE X.4.4

MANPOWER REQUIREMENTS

MANITOBA
OCCUPATION: AUDIOLOGY

YEAR	PROJECTED STOCK	PROJECTED REQUIREMENT	
		POPULATION RATIO[1]	SERVICE TARGET RATIO[2]
1981	17	15	21
		Net -2	4
1982	17	15	21
		Net -2	4
1983	18	15	21
		Net -3	3
1984	18	15	22
		Net -3	4
1985	19	15	22
		Net -4	3
1990	21	16	22
		Net -5	1
1995	24	16	23
		Net -8	-1
2000	26	17	24
		Net -9	-2

Note: 1- POPULATION RATIO
1:70,290

2- SERVICE TARGET RATIO
1:50,000

Traditionally the Government of Manitoba has granted 1 bursary a year towards studies in audiology. This is included under training output. The attrition from retirement has been estimated on actual age distributions kept by the association.

o Estimating Requirements

. Historical Ratio

The current Manitoba ratio of 1 audiologist to 70,290 population, was used to project the number of audiologists required in the future to maintain the current level of manpower.

. Service Target Ratio

The service target ratio of 1 audiologist to 50,000 population, was used to determine a reasonable requirement level of audiologists to attain by the year 2000.

o Net Manpower Requirement

The net manpower requirements under each projection approach are shown in Table X.4.4, opposite. The most likely scenario is based on a service target ratio of 1:50,000 under the medium population projection.

APPENDIX III - SCOPE OF PRACTICE

SPEECH PATHOLOGY AND AUDIOLOGY: CONTROL OF PRACTICE

PROVINCE	CERTIFICATION/LICENSING/REGISTRATION		
	REQUIRED CHARACTERISTICS OF APPLICANTS	CERTIFICATION REQUIREMENTS	LICENSING REQUIREMENTS
Manitoba CAP-105			Speech and Hearing Therapy Act. Full time membership available to the following persons, who: . file with the examining committee a certificate or other evidence satisfactory to the examining committee, showing that they have passed at least junior matriculation examinations or an examination equivalent thereto; . have attended a school or college of speech and hearing therapy that is approved by the board, for at least the number of years prescribed by the board, and passed unconditionally the examinations required by that school or college during those years with such standing therein as is prescibed by the board; . pass an examination, prepared or approved by the examining committee, that may, in the discretion of the committee, include questions or tests on each of the following subjects, that is to say, anatomy, physiology, neurology, psychology, general diagnosis including symptomatology, and the principles and practice of the methods of speech and hearing therapy; and . comply with those provisions of the regulations that concern admission and registration.

APPENDIX IV - BIBLIOGRAPHY

REPORTS

Division of Health Services Research and Development, University of British Columbia, Audiologists and Speech/Language Pathologists in British Columbia - 1979, The Results of a Survey of Members of the B.C. Speech and Hearing Association, Report R:11, February 1980.

Health and Welfare Canada, Clinical Guidelines in Language Speech Pathology and Audiology, March 1980.

Inter-Agency Committee on Speech, Language and Hearing Services, Brief from the Inter-Agency Committee on Speech, Language and Hearing Services, Alberta, March 1975.

Edmonton Catholic School District, Pupil Personnel Services, Future Directions for Pupil Personnel, September 1979.

Alberta Social Services and Community Health.

MacKenzie, E.H., Evaluation of Speech, Language and Hearing Screening Procedures for 4 1/2 to 5 1/2 Year Old Children, November 1980.

Stensland, D.W.; Church, Dr. J.; Lackny, L., Report of the Interdepartmental Working Party on Speech, Language and Hearing Services in Alberta, March 1979.

The Manitoba Speech and Hearing Association, The Need for Programs in Human Communication Disorders in Manitoba, January 1979.

The Manitoba Speech and Hearing Association, Proposal for the Establishment of a Training Program in Communication Disorders at the University of Manitoba, March 1980.

Saskatchewan Department of Health, Working Party on Speech Therapy, Report to the Director of Regional Services Saskatchewan Department of Health of the Working Party on Speech Therapy, December 1975.

Saskatchewan Department of Health, Community Health Services Branch, Report of the Speech Therapy Review Committee, May 1979.

Speech and Hearing Association of Alberta, Summary of Responses to the Report of the Interdepartmental Working Party on Speech, Language and Hearing Services in Alberta, February 1981.

ARTICLES AND PAPERS

Alberta Social Services and Community Health, Response to the Comments of the Speech and Hearing Association of Alberta on the Report of the Interdepartmental Working Party on Speech, Language and Hearing Services in Alberta, 1980.

American Speech-Language-Hearing Association, Fact Sheet on Hearing and Speech Problems, January 1980.

Leske, M.C., "Prevalent Estimates of Communicative Disorders in the U.S.", American Speech, Language, Hearing Association, March 1981.

Government of Manitoba, Department of Health, A Comprehensive Hearing Conservation Program for the Winnipeg Region, 1981.

Manitoba Speech and Hearing Association, Status Report on Audiology and Speech Therapy in Manitoba.

Illerbrun, D.W., "Speech Therapy Needs in Saskatchewan Survey", Saskatchewan Journal of Education Research and Development, University of Saskatchewan, Vol. 6, No. 1, Fall 1975.

Saskatchewan Speech and Hearing Association, Saskatchewan Speech and Hearing Association Position Paper on Speech Aids, March 1981.

Saskatchewan Speech and Hearing Association, Program Based Management Information Systems, Program Overview, April 1980.

PROVINCIAL HEALTH MANPOWER REFERENCE SOURCES

BRITISH COLUMBIA

- Rollcall 79 - A Status Report of Health Personnel in the Province of British Columbia.
  Report R:12
  Division of Health Services Research and Development
  Health Sciences Centre,
  University of British Columbia.

- Rollcall Update 80 - A Status Report of Selected Health Personnel in the Province of British Columbia.
  Report R:16
  Division of Health Services Research and Development
  Health Sciences Centre,
  University of British Columbia.

ALBERTA

Health and Social Service Manpower in Alberta 1980

Alberta - Health and Social Services
Disciplines Committee.

SASKATCHEWAN

Annual Report 1978 - Saskatchewan Health Manpower

Saskatchewan Health.

MANITOBA

Health Manpower Provincial Report - Manitoba 1980.

Manitoba - Department of Health
Research Section.

Province of
British Columbia

Province of
Alberta

Province of
Saskatchewan

Province of
Manitoba

WESTERN CANADA
HEALTH MANPOWER TRAINING STUDY

Category # 3 Report X - B

SPEECH PATHOLOGIST

Report XI - DENTAL OCCUPATIONS
Report XB - DIETICIANS
Report XB - SPEECH PATH

REPORT X-B

SPEECH PATHOLOGISTS

THE REQUIREMENT FOR ALTERNATIVE TRAINING AND FUNDING ARRANGEMENTS IN WESTERN CANADA

REPORT X-B

SPEECH PATHOLOGISTS

TABLE OF CONTENTS

PAGE

I. INTRODUCTION

Study Background.....1
Study Objectives.....1
Study Approach.....2
Occupation Definition.....4

II. TRAINING NEEDS IN WESTERN CANADA

Manpower Requirements.....5
Existing Training Program.....6
Occupational Issues.....7

III. TRAINING RESPONSES

Decision Process.....11
Timing and Location of Manpower Requirements.....11
Indicated Manpower Responses.....13

IV. RECOMMENDATIONS.....17

APPENDIX I - Study Approach and Methodology
APPENDIX II - Provincial Net Manpower Requirement
APPENDIX III - Scope of Practice
APPENDIX IV - Bibliography

I. INTRODUCTION

STUDY BACKGROUND

The provision of effective health services to the community is, to a considerable degree, dependent on three essential resources:

- an adequate supply of well-trained specialist staff in each health occupation group
- the development of adequate facilities to service the community
- the availability of adequate funds to ensure cost-effective and efficient health services.

The range and complexity of health treatment programs has expanded greatly in Canada during the last twenty-five years. In addition, changing technology and the development of new treatment programs have resulted in an increased requirement for skilled, adequately trained health manpower. These factors have resulted in an increased emphasis on manpower planning and skill training for health occupations to ensure an adequate supply of trained practitioners to meet defined manpower requirements.

STUDY OBJECTIVES

The Western Canada Health Manpower Training Study was initiated by the western Premiers at their annual conference in 1980. The study terms of reference contain two major objectives. These are:

- to assess the existing and future needs for health manpower training programs and facilities in western Canada

- to make recommendations for the rationalization of the location and funding of health manpower training programs and facilities in western Canada.

STUDY APPROACH

The study was under the direction of a Steering Committee consisting of health and education representatives from the Provinces of British Columbia, Alberta, Saskatchewan and Manitoba. The study took place over two years and consisted of a review of 26 health occupations grouped into five categories. Each occupation has been studied separately, and a report has been produced for each. In addition, a report examining the inter-relations of the occupations has been submitted to the Steering Committee.

Data was collected from provincial and national associations and from government agencies for each of the occupations on the numbers of individuals registered with the associations and their current status as active or inactive practitioners. An attempt was also made to gather data on historical trends, the number of graduates from training, trends in movement of active practitioners to inactive status, occupational shifts out of the profession, trends in migration to and from other provinces, and immigration and emigration.

In the cases where validated and reliable information was not available, association spokesmen, employers and individuals in each of the occupations were interviewed to provide qualitative opinions regarding present and future trends affecting the manpower supply and requirement.

A literature review was conducted to examine the problems facing the occupation. A bibliography of the material reviewed is contained in Appendix IV.

A health manpower computer model was developed to assist in the preparation of projections on the future supply and requirement for each occupation. A critical analysis of these twenty-year projections was then undertaken to develop the various supply and requirement scenarios presented in this report.

Separate documents describing the manpower planning methodology and the training decision-making process were issued. A brief summary of the overall study approach and methodology is set out in Appendix I and details of the provincial net requirements are set out in Appendix II.

OCCUPATION DEFINITION

This report addresses the need for training programs for speech pathologists in each of the four provinces. For the purpose of this study, a speech pathologist is defined as an an individual who:

"diagnoses and treats speech, language and voice disorders and performs related research. Administers tests and observes patient to diagnose nature of disorder and to evaluate degree of impairment. Plans and conducts remedial exercises and programs to correct stuttering, abnormal articulation and other disorders. Provides speech training for patient with communication problems caused by cerebral palsy, surgical removal of larynx, hearing deficiencies or other impairments. Plans individual or group therapy in rehabilitation of communication disorders. Counsels and guides language-handicapped individuals and their families, teachers or employers. Acts as consultants to educational, medical, dental and other professional groups. Conducts research related to development of diagnostic and treatment techniques and procedures or design of apparatus."[1]

1. Canadian Classification and Dictionary of Occupations, No. 3137-, 1980 Revision.

EXHIBIT 1: MANPOWER REQUIREMENTS

WESTERN CANADA: SPEECH PATHOLOGISTS

YEAR	PROJECTED STOCK	PROJECTED REQUIREMENT	
		POPULATION RATIO[1]	SERVICE TARGET RATIO[2]
1981	603	581	982
		Net -22	379
1982	638	594	1005
		Net -44	367
1983	673	610	1028
		Net -63	355
1984	711	624	1051
		Net -87	340
1985	748	637	1072
		Net -111	324
1990	918	702	1176
		Net -216	258
1995	1078	764	1271
		Net -314	193
2000	1210	819	1361
		Net -391	151

Note: 1- POPULATION RATIOS

British Columbia	1:13,521
Alberta	1:9,053
Saskatchewan	1:22,970
Manitoba	1:10,439

2- SERVICE TARGET RATIO - all provinces
1:7,000

II TRAINING NEEDS IN WESTERN CANADA

This section presents the statistical data for manpower requirements for western Canada, reviews the basis for projection and the confidence in basic data, existing training programs for speech pathologists, and reviews the major issues influencing the occupation.

MANPOWER REQUIREMENTS

Exhibit 1, opposite, shows the projected stock and requirement under two different scenarios for speech pathologists in Western Canada during the period 1981 - 2000.

Methodology

The two scenarios have been established using different approaches to determine manpower requirements. The first uses a constant 1980 provincial population ratio approach for each of the western provinces. This approach assumes that each of the provinces will require the same number of speech pathologists per population as in 1980. Using this approach, the net manpower situation for speech pathologists in Western Canada indicates a surplus of 391 speech pathologists by the year 2000.

The second approach used to determine requirements is the service target ratio approach. This approach identifies a ratio of 1 speech pathologist to 7,000 population as a reasonable requirement level to reach by the year 2000. (The basis for this service target ratio is discussed in more detail in Appendix II.)

Under the service target approach there is a requirement of 151 speech pathologists in western Canada by the year 2000.

The service target ratio approach of 1:7,000, under a medium population growth has been determined as the most likely scenario. This ratio is seen as an optimum ratio and does not necessarily reflect the current situation. Training recommendations for this scenario were developed to reach a relative balance between the supply and requirement of speech pathologists by the year 2000. The ability to reach this balance is however, largely dependent on the availability of and level of government budgetary allocations and the priority to attain an optimum level of speech pathology services. Should government priority determine to reach the ratio before the year 2000, alternative manpower strategies would have to be developed.

Degree of Confidence in Data

The projected stock has been developed on the basis of historical patterns and estimates of immigration, migration and occupational shift, current and projected levels of training and projected attrition from retirement at the age of 65.

The information for these projections have been derived from association records and estimates and government data. In general, the information contained in these records has a reasonable level of accuracy and the projections for speech pathologists are considered acceptable from the point of view of forecasting.

EXISTING TRAINING PROGRAM

There are two programs in western Canada which provide training for speech pathologists. These programs are offered through the University of British Columbia and the University of Alberta. Together the programs will graduate approximately 38 speech pathologists a year.

The speech pathology program offered through the University of British Columbia is at the masters degree level and combines training for speech pathologists and audiologists. The combined enrolment for the program in 1981 was 15 students. The University of British Columbia has indicated that the enrolment will be doubled to a combined intake of 30 by the year 1982.

Of these enrolments between 10 to 14 students are expected to graduate as speech pathologists. The most likely scenario has been developed on the assumption of 12 students a year graduating in speech pathology as of 1984.

The speech pathology program at the University of Alberta is at the baccaulearate level. The program enrolls approximately 27 students and graduates an average of 24 students a year.

Both the provinces of Saskatchewan and Manitoba grant bursaries to students pursuing studies in speech pathology. These average to approximately 3 bursaries a year in Saskatchewan and 7 bursaries a year in Manitoba.

For a more detailed discussion of these training programs please refer to Report 3-A, "The Scope of Existing Training Programs, Category III Occupations."

OCCUPATIONAL ISSUES

The supply and requirements for speech pathologists in western Canada are influenced by a number of general trends and issues. These are:

Historical and Current Trends

o Developing Role

- The awareness of the need for speech pathology services has developed significantly over the last ten years. As a result, the need for additional levels of service have been established for various groups of individuals who require speech pathology services.

- Historically, services to school age children have been a priority. Other groups which have received lower priority for services have included pre-school, adults, the elderly and physically and mentally disabled individuals. The recognized need for additional speech pathology services for these groups will result in a greater demand for speech pathologists.

- Speech pathology services provided to the population have traditionally emphasized assessment and treatment. Additional needs have been identified which would expand the role of the speech pathologist to include the identification of speech disorders, and public education.

o Training Issues

- Training for speech pathology exists at both the undergraduate and graduate level. Graduates from either of these levels are considered qualified speech pathologists. However, various provinces have specific requirements regarding the number of clinical hours a speech pathologist must obtain through training. Where required speech pathologists may have to obtain additional clinical hours to obtain employment as qualified speech pathologists. These requirements may vary in the future with

different restrictions being placed on the minimum level of training and experience required to gain entry into the profession.

o Proportion of Female Practitioners

. Currently it is estimated that approximately 86% of active audiologists and speech pathologists are female. On average, a higher proportion of males are in audiology professions than in speech pathology professions. These trends are expected to continue.

o Pattern of Employment

. Based on survey data from the province of Alberta, it is estimated that approximately 92% of speech pathologists work full time. Limited information is available on the number of part-time hours worked per week, therefore the calculation of full time equivalent practitioners has not been attempted. Actual requirements for speech pathologists are slightly greater if ratios between part-time and full-time participation are taken into consideration.

Situations Likely to Occur with Major Policy Changes

o Use of Technicians

. Para-professionals have been used in the delivery of speech therapy services. Formal standards have not been established for the qualifications and scope of service of para-professionals. The development of standards and stricter control of the scope of service of these para-professional would increase the requirement for speech pathologists.

o Scope of Practice

- Decisions on the scope and extent of speech pathology services are made at a number of levels. These include provincial governments, municipal governments, hospitals, and education authorities. If these decision makers were to significantly change policies within their jurisdiction, the net requirements for speech pathologists would change.

EXHIBIT 2

NET MANPOWER REQUIREMENTS BY PROVINCE

OCCUPATION: SPEECH PATHOLOGISTS

YEAR	BRITISH COLUMBIA		ALBERTA		SASKATCHEWAN		MANITOBA	
	POPULATION RATIO[1]	SERVICE TARGET[2]	POPULATION RATIO[1]	SERVICE TARGET[2]	POPULATION RATIO[1]	SERVICE TARGET[2]	POPULATION RATIO[1]	SERVICE TARGET[2]
1981	-7	177	-16	54	-2	95	3	53
1982	-14	174	-30	43	-5	94	5	56
1983	-21	171	-43	32	-7	93	8	59
1984	-33	163	-56	22	-9	93	11	62
1985	-45	155	-69	11	-10	93	13	65
1990	-97	122	-128	-36	-17	93	26	79
1995	-144	91	-175	-73	-24	92	29	83
2000	-186	65	-211	-98	-25	97	31	87

NOTE: 1- POPULATION RATIOS

British Columbia	1:13,521
Alberta	1:9,053
Saskatchewan	1:22,970
Manitoba	1:10,439

2- SERVICE TARGET RATIO
1:7,000

II TRAINING RESPONSES

DECISION PROCESS

The decision process outlined in Appendix I and discussed in detail in Report C, "A Decision Process To Evaluate the Location of, and Funding Arrangements For Health Occupation Training Programs in Western Canada", was used to evaluate the training implications of the net manpower requirements for dental mechanics discussed in Section 1.1, above. This section contains the results of this analysis.

TIMING AND LOCATION OF MANPOWER REQUIREMENTS

Exhibit 2, opposite, shows the projected net manpower requirements for speech pathologists in each of the western provinces for the period 1981 - 2000. The projections are developed on both a constant 1980 provincial population ratio and a service target ratio of 1:7,000. The most likely scenario for speech pathologists has been determined using the service target ratio approach.

o British Columbia

Under the 1980 population ratio, British Columbia develops a surplus of 97 speech pathologists by 1990 and a surplus of 186 speech pathologists by the year 2000. This averages to an annual surplus of 9 speech pathologists over the 20 year period. The data is based on the assumption that the majority of graduates from the speech pathology program enter the British Columbia labour market. The service target ratio approach results in a net requirement for an additional 65 speech pathologists by the year 2000, or an average annual requirement of 3 speech pathologists over a 20 year period.

o Alberta

In Alberta using the population ratio, a potential surplus of 211 speech pathologists is forecast by the year 2000. This indicates an average annual surplus of approximately 10 speech pathologists a year, throughout the forecast period. Under the service target ratio a surplus of 98 speech pathologists is determined by the year 2000. This averages to a net annual surplus of 5 speech pathologists a year between 1981 - 2000. The data for both the population ratio approach and the service target approach is based on the assumption that the majority of graduates from the Speech Pathology program in Alberta will enter the Alberta labour market. It is also based on the assumption that existing migration and immigration patterns will continue.

o Saskatchewan

In Saskatchewan, the 1980 population ratio approach indicates a surplus of 25 speech pathologists by the year 2000. Under the service target approach there is a requirement for 97 additional speech pathologists by the year 2000, or an average of 5 speech pathologists a year.

o Manitoba

In Manitoba, the population ratio approach results in a requirement for 31 additional speech pathologists over the forecast period. Under the service target ratio approach the requirement increases to 87 speech pathologists, or an average requirement for an additional 4 speech pathologists a year over the 20 year period.

INDICATED MANPOWER RESPONSES

Training is seen as an appropriate response to establishing a relative balance between the supply and requirement of speech pathologists in Western Canada by the year 2000.

The net manpower requirements projected using the 1980 provincial population ratios indicate a surplus of speech pathologists in British Columbia, Saskatchewan and Alberta with a requirement for speech pathologists in Manitoba. Based on this approach training recommendations would consider a reduction in the number of speech pathology graduates in both the provinces of British Columbia and Alberta. Before determining levels of reduction for each program, however, a study should be undertaken to determine the average number of out of province speech pathologists who are trained in either of the western Canada programs and leave the province. These numbers must be determined to develop a more accurate assessment of the actual size of the surplus. In addition, the University of British Columbia should establish some controls over the number of students specializing in either speech pathology or audiology.

The net manpower requirements projected on the service target approach indicates a requirement for additional speech pathologists in British Columbia, Saskatchewan and Manitoba, and a potential surplus in Alberta. The indicated training response to this situation would be to increase the number of graduates in speech pathology from the British Columbia program. This would not mean an increase in the enrollment in the Speech and Audiology program at the University of British Columbia but rather control over the number of students entering speech pathology specialties as opposed to audiology specialties.

The University of Alberta should provide training in speech pathology for the provinces of Alberta, Saskatchewan and Manitoba. Previously the provinces of Saskatchewan and Manitoba have provided bursaries for students

to study speech pathology in either the U.S.A. or Canada. These studies were usually at the masters degree level.

If the University of Alberta is designated as the training program for Alberta, Saskatchewan and Manitoba, bursaries in Saskatchewan and Manitoba should be available for studies at the undergraduate level. In addition, the provinces of Saskatchewan and Manitoba should review possible concerns regarding the acceptability of speech pathologists trained at the undergraduate level. Issues for resolution may include the number of clinical hours during training, the maturity of the individual and attitudes of employers.

Enrolments in the University of Alberta speech pathology program, would have to be increased to meet the net manpower requirements, for the provinces of Alberta, Saskatchewan and Manitoba, determined through use of the service target approach. This increase in enrolment would result in an increase in the number of clinical placements for students. In order to meet the number of clinical placements required, the provinces should make arrangements for bursary students to obtain their clinical training in the province of origin. The standards determined for clinical placements would however have to be maintained. This approach would allow students to gain specific localized work experience and establish their profession in their own province.

An alternative to the development of a central training program for Alberta, Saskatchewan and Manitoba, would be to develop a joint program for the provinces of Saskatchewan and Manitoba. Based on the service target ratio the two provinces have a requirement for an average of 18 additional speech pathologists through training per year throughout the forecast period.

Given this limited manpower requirement, the preferred option is to train speech pathologists in one program at the University of Alberta. If,

however, the provinces of Saskatchewan and Manitoba experience problems in the future with the retention of students trained out of province further consideration should be given to the development of a joint speech pathology program for the provinces of Saskatchewan and Manitoba.

Defined Alternative Locations

We recommend that the existing training programs in Speech Pathology at the University of British Columbia and the University of Alberta continue, with the University of Alberta providing additional training places in speech pathology for students from Saskatchewan and Manitoba.

As an alternative, the development of an additional joint program between the provinces of Saskatchewan and Manitoba should be reviewded. If this alternative is preferred, the program could be located at the University of Saskatchewan, University of Regina or University of Manitoba.

Review of Funding Arrangements

The provinces of Saskatchewan and Manitoba should enter into bilateral training agreements with the Government of Alberta. Specifically Saskatchewan should contract 7 places annually and Manitoba should contract 11 places annually. Each of these provinces should share the ongoing operational and administrative overhead costs of the University of Alberta program based on the proportion of training places contracted. Program development, start-up and capital costs would be excluded from these training agreements on the basis that the program is already in existence.

Defined Length of Training Agreement

The provinces of Saskatchewan and Manitoba establish formal training agreements with the Government of Alberta for an initial five year period, with subsequent renewal options for additional five year periods.

IV RECOMMENDATIONS

Recommendations for each of the four provinces are set out below.

- British Columbia

.1- That the University of British Columbia, Speech and Audiology program continue with an enrolment of 30 students a year.

.2- That the University of British Columbia initiate measures to control the proportion of students graduating as audiologists or speech pathologists.

.3- That the proportion of students graduating in speech pathology be increased to a minimum of 14 a year.

- Alberta, Saskatchewan and Manitoba

.4- That the University of Alberta be designated as the University responsible for training speech pathologists at the baccalaureate level for Alberta, Saskatchewan and Manitoba.

.5- That the enrolment be increased by 13 places a year to accommodate an enrolment of 40 students.

.6- That Saskatchewan contract for 7 places annually, and Manitoba 11 places annually, and Alberta secure 22 places per year in the University of Alberta program.

.7- That each province share in the ongoing operation and administrative overhead costs of the program based on the proportion of training places allocated to each province.

.8- That formal bilateral training agreements for the program be negotiated between Alberta, Saskatchewan and Manitoba for an initial period of five years, with subsequent renewal options for additional five year periods.

.9- That the Province of Saskatchewan increase the number of bursaries available for studies in speech pathology from 2 to 7 bursaries a year.

.10- That these bursaries be made available to students studying at the undergraduate level at the University of Alberta.

.11- That the Province of Manitoba increase the number of bursaries available for studies in speech pathology from 7 to 11 bursaries a year.

.12- That these bursaries be made available to students studying at the undergraduate level at the University of Alberta.

Saskatchewan and Manitoba

.13- That a continual review by conducted on the number of students obtaining bursaries and returning to Saskatchewan and Manitoba. If these numbers are continually lower than the actual number of bursaries granted, the rationale of training out of province through bursaries should be questioned and the alternative of setting up a joint speech pathology program between the provinces of Saskatchewan and Manitoba should be considered.

.14- That if the provinces of Saskatchewan and Manitoba prefer the development of a new program in speech pathology, that the program have an annual enrolment of 20 students, with 8 places for Saskatchewan and 12 places for Manitoba.

APPENDIX I

STUDY APPROACH AND METHODOLOGY

STUDY APPROACH

Introduction

In order to achieve the study objectives, the work program consists of three key activities. These are:

- the analysis of manpower supply and requirements, and the calculation of net manpower requirements
- the analysis of existing training programs for Western Canada
- the development of recommendations for alternative training locations and funding arrangements

Analysis of Manpower Supply and Requirements

The analysis of manpower supply and requirements is designed to allow for a variety of data inputs, and for different emphasis depending on the occupation under review. A variety of data sources are used including provincial and national associations, health insurance agencies, and provincial health and education departments. In all instances, data is developed independently of previously published sources.

In addition to the basic projection of net manpower requirements, a number of sensitivity analyses have been completed to assess the impact of changed in the factors affecting supply and requirements, prior to developing recommendations for either additional training programs, or expanding existing training programs.

Approaches to Determining Manpower Requirements

The approach developed to determine manpower requirements uses three methods of projection. These are discussed below.

1. Service Utilization Approach

The utilization approach is based on an analysis of the pattern of health service usage. It establishes trends in service utilization and projects these onto future population estimates. There are three steps in the service utilization approach.

Step 1 - Determine Per Capita Utilization Rate

Historical data of the number of services provided, by age and sex of recipient is derived. The number of services per age/sex group is then divided by the population for group in the corresponding year. This results in a per capita utilization rate.

Step 2 - Project Future Service Required

The per capita utilization rate is projected onto the low, medium and high population for each year from 1981 to 2000. This results in an estimate of total future services.

Step 3 - Estimated Number of Practitioners Required

Having determined the total future services, the model projects the number of practitioners required, by assuming a constant level of services per practitioner. The number of services per practitioner is determined by dividing total services by the number of practitioners in the base year. To estimate the required number of practitioners, the model divides total future services required by the number of services per practitioner.

2. Service Target Ratio Approach

Service target ratios reflect a theorectical optimal manpower level required to meet health service requirements in the occupation under review. They are expressed as the ratio of practitioner to population. The service target ratios are derived based on discussion with health authorities, review of published reports, articles and summary of defined health care needs.

3. Population Ratio Approach

Population ratios are derived by dividing the total population at a specific point in time by the number of active practitioners. This results in a ratio of practitioners to population.

These ratios are analysed to determine if any trends exists. to project futuren manpower requirements, the model divides total projected population by the previously determined population ratio.

Summary of Approaches to Projecting Manpower Requirements

The three approaches outlined above have been used for the calculation of manpower requirements for this occupation. The specific application of each approach to this occupation is discussed under General Assumption, Appendix II, following.

Development of Recommendations for Alternative Training Locations and Funding Arrangements

We have developed a decision process to assist in developing recommendations for alternative training location(s) and funding arrangements. This process is designed to allow for the logical, consistent evaluation of a range of training alternatives.

There are seven steps in the decision process:

- Step 1. Analysis of manpower requirements
- Step 2. Identification of the appropriate type(s) of training
- Step 3. Definition of alternative training locations
- Step 4. Evaluation of alternative locations for new programs
- Step 5. Establishment of timing of training program requirement
- Step 6. Recommendation on training action(s) and location(s)
- Step 7. Recommendation on funding alternative(s)

LABOUR MARKET SUPPLY

Labour market supply is the relationship between the estimated number of practitioners registered with the provincial associations, the number of practitioners actually employed and the number of vacant positions. Vacancy survey data (normally collected by provincial governments) will identify the total number of budgeted positions, which is the total of the number currently employed plus vacancies.

Labour market supply is a useful tool to estimate, or determine the employment situation for each occupation. The current supply situation is expressed as total budgeted positions divided by the total number of registered practitioners. This percentage (%) of qualified practitioners who are currently employed will indicate the flexability of the existing labour market.

Typically the flexability of the labour market will reflect vacancy rates. The following table illustrates theoretical labour market situations:

"Tight" labour market - 90% - 95% of practitioners actively employed with a vacancy rate of 12% to 20%.

"Balanced" Labour Market - 80% - 90% of practitioners actively employed with a vacancy rate of 8% to 12%.

"Loose" Labour Market - 70% - 80% of practitioners actively employed with a vacancy rate of 0% to 8%.

APPENDIX II

PROVINCIAL NET MANPOWER REQUIREMENTS

Table X.0.1

Number of Practitioners by Province in Western Canada

Occupation: SPEECH PATHOLOGISTS

Year	British Columbia[1]	Alberta[2]	Saskatchewan[3]	Manitoba[4]
1977	132	168	46	104
1978	-	200	41	103
1979	-	211	43	94
1980	194	230	42	101

SOURCE:

1 DATA 1977
DIVISION OF HEALTH SERVICES RESEARCH AND DEVELOPMENT, INFORMATION TAKEN FROM ROLL-CALL '77.

DATA 1980
ESTIMATE BASED ON REPORT R:11, HEALTH MANPOWER RESEARCH UNIT (H.M.R.U.), DIVISION OF HEALTH SERVICES RESEARCH AND DEVELOPMENT, HEALTH SERVICES CENTER, UNIVERSITY OF BRITISH COLUMBIA

2 SPEECH AND HEARING ASSOCIATION OF ALBERTA (S.H.A.A.)

3 SASKATCHEWAN SPEECH AND HEARING ASSOCIATION (S.S.H.A.)

4 MANITOBA SPEECH AND HEARING ASSOCIATION (M.S.H.A.), GOVERNMENT OF MANITOBA, HEALTH MANPOWER PROVINCIAL REPORT, MANITOBA 1980.

NOTE:

FOR ALL PROVINCES THE DATA IS AN ESTIMATE OF ACTIVE SPEECH PATHOLOGISTS.

Table X.0.2

Factors Affecting Manpower Supply in Western Canada

Occupation: SPEECH PATHOLOGISTS

Factor	British Columbia	Alberta
Opening Stock	194	230
Net Migration	7 for all years	6 for all years
Net Immigration	3 for all years	2 for all years
Net Occupation Shift	-3% of opening stock	-3% of opening stock
Training Output	6 for 1981-1983 12 for 1984-2000	23 for all years
Attrition	Actual Retirement	Actual Retirement

	Saskatchewan	Manitoba
Opening Stock	42	101
Net Migration	2 for all years	-5 for all years
Net Immigration	0 for all years	-1 for 1981-1990 Zero for 1991-2000 0
Net Occupation Shift	-3% of opening stock	-3% of opening stock
Training Output	2 for all years	7 for all years
Attrition	Actual Retirement	Actual Retirement

GENERAL ASSUMPTIONS

Manpower Stock

Table X.0.1, opposite, illustrates the total number of active speech pathologists identified in each of the provinces in Western Canada.

Factors Affecting Manpower Supply

The assumptions made with respect to each of the factors which have the potential to affect manpower stock are shown opposite in Table X.0.2. These factors include migration, immigration, training output, active/inactive movement and retirement through attrition. For each of these assumptions, the information source has been identified. Assumptions affecting manpower have been based on historical and current information along with projected trends.

Estimating Requirements

- Historical Ratio

  For each province, the current ratio of speech pathologists to population was used to project the number of practitioners required in the future to maintain to current level of manpower.

- Utilization

  The utilization approach was not used to determine net manpower requirements for speech pathologists. Utilization data for speech pathologists is not age specific, therefore, it does not provide an accurate utilization pattern of services related to the changing proportion of population age groups.

o Service Target Ratio

The service target ratio has been developed from information obtained from the "Report of the Interdepartmental Working Party on Speech, Language and Hearing Services in Alberta, (1979)".

The report uses an epidemiological approach to determine requirements for speech pathologists.

The Working Party establishes a range of services to reach for by the year 1985. These include working toward having 481 speech pathologists, a ratio of 1:5,000 in 1985 or having 710 speech pathologists, a ratio of 1:3,500 in 1985. They identify the lack of hard data available to determine actual needs and establish an interum goal of 354 speech pathologists, a ratio of 1:7,000, to reach for by 1985. For purposes of this report the service target ratio of 1:7,000 has been identified to be reached by all four of the western provinces by the year 2000. Should government policy choose to reach this level before the year 2000, alternative manpower strategies would be required.

Sensitivity Analysis

A service target ratio established in the early 1970's, by the American Speech and Hearing Association, was analyzed to determine the effect on net manpower requirements for speech pathologists. The service target is based on a need of 1 speech pathologist per 8,000 pre-school children, per 4,000 school age children and per 25,000 adults. Using this requirement ratio the province of British Columbia would have a small surplus, Alberta would have a larger surplus and Saskatchewan and Manitoba would have a requirement of about half that projected under the most likely scenario. For western

Canada this would indicate a surplus of approximately 260 speech pathologists by the year 2000.

It has been suggested by some professionals within the industry that a ratio of 1:5,000 is a more appropriate level of service to reach for to provide a complete range of speech pathology services. In using this requirement ratio the province of British Columbia would increase its requirement by four times that under a service target ratio of 1:7,000. British Columbia would require an additional 17 speech pathologists a year through training to meet manpower requirements by the year 2000. In Alberta, the surplus developing using a ratio of 1:7,000 would change to a requirement of 100 additional speech pathologists by the year 2000, or an additional 7 speech pathologists a year through training. Saskatchewan would have a requirement for 168 additional speech pathologists by the year 2000, or a need for an additional 10 speech pathologists a year through training to meet the ratio of 1:5,000 by the year 2000. In Manitoba, the requirement would almost double that determined under the ratio of 1:7,000 and a requirement for an additional 10 speech pathologists a year through training would be required to reach the ratio of 1:5,000 by the year 2000.

For western Canada, reaching a ratio of 1 speech pathologist for 5,000 population, would indicate a requirement for an additional 693 speech pathologists by the year 2000.

TABLE X.1.1

PROVINCE: BRITISH COLUMBIA
OCCUPATION: SPEECH PATHOLOGISTS

YEAR	NUMBER OF PRACTITIONERS	POPULATION TO MANPOWER
1977	132	1:18886
1978	-	-
1979	-	-
1980	194	1:13520

SOURCE:

DATA 1977
DIVISION OF HEALTH SERVICES RESEARCH AND DEVELOPMENT, INFORMATION TAKEN FROM ROLL-CALL '77.

DATA 1980
REPORT R:11, HEALTH MANPOWER RESEARCH UNIT (H.M.R.U.), DIVISION OF HEALTH SERVICES RESEARCH AND DEVELOPMENT, UNIVERSITY OF BRITISH COLUMBIA. THE DATA IS AN ESTIMATE OF ACTIVE SPEECH PATHOLOGISTS.

BRITISH COLUMBIA SPEECH AND HEARING ASSOCIATION (B.C.S.H.A.)

Table X.1.2

Factors Affecting Manpower Supply

Province: BRITISH COLUMBIA
Occupation: SPEECH PATHOLOGISTS

Factor	Assumption	Source
Opening Stock	194	H.M.R.U. & B.C.S.H.A.[2]
Net Migration	7 for all years	H.M.R.U. & B.C.S.H.A.[2]
Net Immigration	3 for all years	H.M.R.U. & B.C.S.H.A.[2]
Net Occupational Shift[1]	-3% of opening stock	ESTIMATE[3]
Training Output	6 for 1981-1983 12 for	U. OF B.C.[4]
Attrition	Actual Retirement	H.M.R.U. & B.C.S.H.A.[2]

Notes:

[1] Includes Active/Inactive Flows

[2] ESTIMATES FROM, REPORT R:11, HEALTH MANPOWER RESEARCH UNIT (H.M.R.U.), DIVISION OF HEALTH SERVICES RESEARCH AND DEVELOPMENT, UNIVERSITY OF BRITISH COLUMBIA

BRITISH COLUMBIA SPEECH AND HEARING ASSOCIATION (B.C.S.H.A.)

[3] ESTIMATE, DETERMINED FROM RESEARCH ON THE OCCUPATION

[4] UNIVERSITY OF BRITISH COLUMBIA

TABLE X.1.3

SPEECH PATHOLOGISTS AND AUDIOLOGISTS

IN BRITISH COLUMBIA BY AGE,

AGE GROUP	MALE	FEMALE	TOTAL
Less than 26	-	30	30
26 - 35	-	181	181
36 - 45	-	52	52
46 - 55	-	11	11
More than 56	-	9	9
Total	-	283	283

Source: Estimates based on percentage of active and inactive practitioners who are members of the B.C. Speech and Hearing Association and proportion in each age group based on age distribution of respondents in Report R:11, prepared by Health Manpower Research Unit.

PROVINCIAL ASSUMPTIONS

BRITISH COLUMBIA

a) Legal Controls

There is no legislation controlling the right to practice.

b) Assumptions

Table X.1.1, opposite, indicates the total number of speech pathologists in British Columbia identified as active.

o Factors Affecting Manpower Supply

The assumptions made with respect to each of the factors which have the potential to affect manpower supply are shown in Table X.1.2, opposite. These factors include migration, immigration, active to inactive movements, training output and retirement. For each assumption, the information source has been identified. The age distribution for Speech Pathologists and Audiologists is shown in Table X.1.3.

o Confidence in Factors Affecting Manpower Supply

The assumptions made on manpower supply for speech pathologists were developed from information published in Report R:11, through the Health Manpower Research Unit (HMRU) and from estimates made by the association.

The active stock is considered to be fairly accurate. No records are kept on the movements from migration, immigration or from active to inactive, therefore assumptions were developed on estimates. The

TABLE X.1.4

NET MANPOWER REQUIREMENTS

BRITISH COLUMBIA
OCCUPATION: SPEECH PATHOLOGISTS

YEAR	PROJECTED STOCK	PROJECTED REQUIREMENT	
		POPULATION RATIO[1]	SERVICE TARGET RATIO[2]
1981	205	198	382
		Net -7	177
1982	216	202	390
		Net -14	174
1983	227	206	398
		Net -21	171
1984	243	210	406
		Net -33	163
1985	259	214	414
		Net -45	155
1990	331	234	453
		Net -97	122
1995	397	253	488
		Net -144	91
2000	454	268	519
		Net -186	65

Note: 1- POPULATION RATIO
1:13,521
2- SERVICE TARGET RATIO
1:7,000

active to inactive estimates are based on a minimal movement of -3%. The training figures assume that the majority of graduates enter the British Columbia work force and that the size of the program will increase by 1983. This information was obtained from the University of British Columbia. Specific age distributions are not kept for speech pathologists through the association. Estimates are based information obtained from the R:11 Report and retirement at the age of 65.

o Estimating Requirements

. Historical Ratio

The current British Columbia ratio of 1 speech pathologist to 13,521 population, was used to project the number of speech pathologists required in the future to maintain the current level of manpower.

. Service Target Ratio

The service target ratio of 1 speech pathologist to 7,000 population, was used to determine a reasonable requirement level of speech pathologists to attain by the year 2000.

o Net Manpower Requirement

The net manpower requirements under each projection approach are shown in Table X.1.4, opposite. The most likely scenario is based on a service target ratio of 1:7,000 under the medium population projection.

Table X.2.1

Province: ALBERTA
Occupation: SPEECH PATHOLOGISTS

Year	Number of Practitioners	Population to Manpower
1977	168	1: 11290
1978	200	1: 9760
1979	211	1: 9570
1980	230	1: 9050

Source: SPEECH AND HEARING ASSOCIATION OF ALBERTA (S.H.A.A.)

THE DATA IS AN ESTIMATE OF ACTIVE SPEECH PATHOLOGISTS

Table X.2.2

Factors Affecting Manpower Supply

Province: ALBERTA
Occupation: SPEECH PATHOLOGISTS

Factor	Assumption	Source
Opening Stock	230	S.H.A.A.[2]
Net Migration	6 for all years	S.H.A.A.[2]
Net Immigration	2 for all years	S.H.A.A.[2]
Net Occupational Shift[1]	-3% of opening stock	Estimate[3]
Training Output	23 for all years	U. of A.[4]
Attrition	Actual Retirement	Estimate[5]

Notes:

[1] Includes Active/Inactive Flows

[2] Speech and Hearing Association of Alberta (S.H.A.A.)

[3] Estimate, determined from research on the occupation

[4] University of Alberta

[5] Estimates, made by the S.H.A.A., no records are kept on age distribution

PROVINCIAL ASSUMPTIONS

ALBERTA

a) Legal Controls

There is no legislation controlling the right to practice.

b) Assumptions

Table X.2.1, opposite, indicates the total number of speech pathologists in Alberta identified as active.

o Factors Affecting Manpower Supply

The assumptions made with respect to each of the factors which have the potential to affect manpower supply are shown in Table X.2.2, opposite. These factors include migration, immigration, active to inactive movements, training output and retirement. For each assumption, the information source has been identified.

o Confidence in Factors Affecting Manpower Supply

The assumptions made on manpower supply for speech pathologists were developed from estimates made by the association. The active stock includes both speech pathologists in the association and an estimate of the speech pathologists who are not members of the association. No records are kept on the movements from migration, immigration or from active to inactive, therefore the assumptions were developed on estimates made by the association. The active to inactive movement estimates are based on a minimal movement of -3%.

TABLE X.2.4

MANPOWER REQUIREMENTS

ALBERTA
OCCUPATION: SPEECH PATHOLOGY

YEAR	PROJECTED STOCK	PROJECTED REQUIREMENT	
		POPULATION RATIO[1]	SERVICE TARGET RATIO[2]
1981	254	238	308
		Net -16	54
1982	277	247	320
		Net -30	43
1983	300	257	332
		Net -43	32
1984	322	266	344
		Net -69	22
1985	343	274	354
		Net -69	11
1990	440	312	404
		Net -128	-36
1995	524	349	451
		Net -175	-73
2000	596	385	498
		Net -211	-98

Note: 1- POPULATION RATIO
1:9,053

2- SERVICE TARGET RATIO
1:7,000

The projections for training were determined on information obtained from the University of Alberta. It assumes that the majority of graduates enter the Alberta work force.

Specific age distributions are not kept for speech pathologists through the association. Estimates are based assuming the majority of speech pathologists and currently under the age of 45 years, therefore no retirements are expected during the 20 year period.

o Estimating Requirements

- Historical Ratio

  The current Alberta ratio of 1 speech pathologist to 9,053 population, was used to project the number of speech pathologists required in the future to maintain the current level of manpower.

- Service Target Ratio

  The service target ratio of 1 speech pathologist to 7,000 population, was used to determine a reasonable requirement level of speech pathologists to attain by the year 2000.

o Net Manpower Requirement

The net manpower requirements under each projection approach are shown in Table X.2.3, opposite. The most likely scenario is based on a service target ratio of 1:7,000 under the medium population projection.

Table X.3.1

Province: SASKATCHEWAN
Occupation: SPEECH PATHOLOGISTS

Year	Number of Practitioners	Population to Manpower
1977	46	1: 20370
1978	41	1: 23110
1979	43	1: 22230
1980	42	1: 22970

Source: SASKATCHEWAN SPEECH AND HEARING ASSOCIATION (S.S.H.A.)

THE DATA IS AN ESTIMATE OF ACTIVE SPEECH PATHOLOGISTS

Table X.3.2

Factors Affecting Manpower Supply

Province: SASKATCHEWAN
Occupation: SPEECH PATHOLOGISTS

Factor	Assumption	Source
Opening Stock	42	S.S.H.A.[2]
Net Migration	2 for all years	S.S.H.A.[2]
Net Immigration	0 for all years	S.S.H.A.[2]
Net Occupational Shift[1]	-3% of opening stock	Estimate[3]
Training Output	2 for all years	Government of Saskatchewan[4]
Attrition	Actual Retirement	S.S.H.A.

Notes:

[1] Includes Active/Inactive Flows

[2] Saskatchewan Speech and Hearing Association (S.S.H.A.)

[3] Estimate, determined from research on the occupation

[4] Government of Saskatchewan, the average number of bursaries granted for studies in speech pathology

TABLE X.3.3

SPEECH PATHOLOGISTS AND AUDIOLOGISTS

IN SASKATCHEWAN BY AGE,

AGE GROUP	MALE	FEMALE	TOTAL
20 - 24	-	-	3
25 - 29	-	-	15
30 - 34	-	-	20
35 - 39	-	-	3
40 - 44	-	-	5
45 and over	-	-	7
Unknown	-	-	-
Total	-	-	53

Source: The Saskatchewan Speech and Hearing Association.

PROVINCIAL ASSUMPTIONS

SASKATCHEWAN

a) Legal Controls

There is no legislation controlling the right to practice.

b) Assumptions

Table X.3.1, opposite, indicates the total number of speech pathologists in Saskatchewan identified as active.

o Factors Affecting Manpower Supply

The assumptions made with respect to each of the factors which have the potential to affect manpower supply are shown in Table X.3.2, opposite. These factors include migration, immigration, active to inactive movements, training output and retirement. For each assumption, the information source has been identified. The age distribution for Speech Pathologists and Audiologists is shown in Table X.3.3.

o Confidence in Factors Affecting Manpower Supply

The assumptions made on manpower supply for speech pathologists were developed from estimates made by the association. The active stock includes both speech pathologists in the association and an estimate of the speech pathologists who are not members of the association. No records are kept on the movements from migration, immigration or from active to inactive, therefore the assumptions were developed on estimates made by the association. The active to inactive movement estimates are based on a minimal movement of -3%.

TABLE X.3.4

NET MANPOWER REQUIREMENTS

SASKATCHEWAN
OCCUPATION: SPEECH PATHOLOGISTS

YEAR	PROJECTED STOCK	PROJECTED REQUIREMENT	
		POPULATION RATIO[1]	SERVICE TARGET RATIO[2]
1981	45	43	140
		Net -2	95
1982	48	43	142
		Net -5	94
1983	51	44	144
		Net -7	93
1984	53	44	146
		Net -9	93
1985	55	45	148
		Net -10	93
1990	65	48	158
		Net -17	93
1995	75	51	167
		Net -24	92
2000	78	53	175
		Net -25	97

Note: 1- POPULATION RATIO
1:22,973

2- SERVICE TARGET RATIO
1:7,000

Traditionally the Government of Saskatchewan has granted 2 bursaries a year towards studies in speech pathology. This is included under training output. The attrition from retirement has been estimated on actual age distributions kept by the association.

o Estimating Requirements

- Historical Ratio

The current Saskatchewan ratio of 1 speech pathologist to 22,973 population, was used to project the number of speech pathologists required in the future to maintain the current level of manpower.

- Service Target Ratio

The service target ratio of 1 speech pathologist to 7,000 population, was used to determine a reasonable requirement level of speech pathologists to attain by the year 2000.

o Net Manpower Requirement

The net manpower requirements under each projection approach are shown in Table X.3.4, opposite. The most likely scenario is based on a service target ratio of 1:7,000 under the medium population projection.

Table X.4.1

Province: MANITOBA
Occupation: SPEECH PATHOLOGISTS

Year	Number of Practitioners	Population to Manpower
1977	104	1: 9900
1978	103	1: 10030
1979	94	1: 11140
1980	101	1: 10440

Source: MANITOBA SPEECH AND HEARING ASSOCIATION (M.S.H.A.)

GOVERNMENT OF MANITOBA, HEALTH MANPOWER PROVINCIAL REPORT MANITOBA, 1980

THE DATA IS AN ESTIMATE OF ACTIVE SPEECH PATHOLOGISTS

Table X.4.2

Factors Affecting Manpower Supply

Province: MANITOBA
Occupation: SPEECH PATHOLOGISTS

Factor	Assumption	Source
Opening Stock	101	M.S.H.A.[2] GOVERNMENT OF MANITOBA[3]
Net Migration	-5 for all years	M.S.H.A.[2]
Net Immigration	-1 for 1981-1990 Zero for 1991-200 0	M.S.H.A.[2]
Net Occupational Shift[1]	-3% of opening stock	ESTIMATE[4]
Training Output	7 for all years	GOVERNMENT OF MANITOBA[5]
Attrition	Actual Retirement	M.S.H.A.[2]

Notes:

[1] Includes Active/Inactive Flows

[2] MANITOBA SPEECH AND HEARING ASSOCIATION (M.S.H.A.)

[3] GOVERNMENT OF MANITOBA, HEALTH MANPOWER PROVINCIAL REPORT MANITOBA, 1980

[4] ESTIMATE, DETERMINED FROM RESEARCH ON THE OCCUPATION

[5] GOVERNMENT OF MANITOBA, THE AVERAGE NUMBER OF BURSARIES GRANTED FOR STUDIES IN SPEECH PATHOLOGY

TABLE X.4.3

SPEECH PATHOLOGISTS AND AUDIOLOGISTS

IN MANITOBA BY AGE,

AGE GROUP	MALE	FEMALE	TOTAL
20 - 24	-	11	11
25 - 29	6	48	54
30 - 34	6	15	21
35 - 39	6	17	23
40 - 44	1	3	4
45 - 49	-	3	3
50 - 54	-	6	6
55 - 59	-	1	1
60 - 64	-	-	-
65 and over	-	-	-
Unknown	-	-	-
Total	19	104	123

Source: The Manitoba Speech and Hearing Association

PROVINCIAL ASSUMPTIONS

MANITOBA

a) Legal Controls

An Act respecting the Practice of Speech and Hearing Therapy (Cap. 105, 1961) is the Act regulating the practice of speech pathologists in the province of Manitoba. The certification and licensing requirements are shown in Appendix III - Scope and Control of Practice.

b) Assumptions

Table X.4.1, opposite, indicates the total number of speech pathologists in Manitoba identified as active.

o Factors Affecting Manpower Supply

The assumptions made with respect to each of the factors which have the potential to affect manpower supply are shown in Table X.4.2, opposite. These factors include migration, immigration, active to inactive movements, training output and retirement. For each assumption, the information source has been identified. The age distribution for Speech Pathologists and Audiologists is shown in Table X.4.3.

o Confidence in Factors Affecting Manpower Supply

The assumptions made on manpower supply for speech pathologists were developed from estimates made by the association. The active stock includes both speech pathologists in the association and an estimate of the speech pathologists who are not members of the association. No records are kept on the movements from migration, immigration or from

TABLE X.4.4

MANPOWER REQUIREMENTS

MANITOBA
OCCUPATION: SPEECH PATHOLOGIST

YEAR	PROJECTED STOCK	PROJECTED REQUIREMENT	
		POPULATION RATIO[1]	SERVICE TARGET RATIO[2]
1981	99	102	152
		Net 3	53
1982	97	102	153
		Net 5	59
1983	95	103	154
		Net 8	59
1984	93	104	155
		Net 11	62
1985	91	104	156
		Net 13	65
1990	82	108	161
		Net 26	79
1995	82	111	165
		Net 29	83
2000	82	113	169
		Net 31	87

Note: 1- POPULATION RATIO
1:10,439

2- SERVICE TARGET RATIO
1:7,000

active to inactive, therefore the assumptions were developed on estimates made by the association. The active to inactive movement estimates are based on a minimal movement of -3%.

Traditionally the Government of Manitoba has granted 7 bursaries a year towards studies in speech pathology. This is included under training output. The attrition from retirement has been estimated on actual age distributions kept by the association.

o Estimating Requirements

. Historical Ratio

The current Manitoba ratio of 1 speech pathologist to 10,439 population, was used to project the number of speech pathologists required in the future to maintain the current level of manpower.

. Service Target Ratio

The service target ratio of 1 speech pathologist to 7,000 population, was used to determine a reasonable requirement level of speech pathologists to attain by the year 2000.

o Net Manpower Requirement

The net manpower requirements under each projection approach are shown in Table X.4.4, opposite. The most likely scenario is based on a service target ratio of 1:7,000 under the medium population projection.

APPENDIX III - SCOPE OF PRACTICE

SPEECH PATHOLOGY AND AUDIOLOGY: CONTROL OF PRACTICE

PROVINCE	CERTIFICATION/LICENSING/REGISTRATION		
	REQUIRED CHARACTERISTICS OF APPLICANTS	CERTIFICATION REQUIREMENTS	LICENSING REQUIREMENTS
Manitoba CAP-105			Speech and Hearing Therapy Act. Full time membership available to the following persons, who: . file with the examining committee a certificate or other evidence satisfactory to the examining committee, showing that they have passed at least junior matriculation examinations or an examination equivalent thereto; . have attended a school or college of speech and hearing therapy that is approved by the board, for at least the number of years prescribed by the board, and passed unconditionally the examinations required by that school or college during those years with such standing therein as is prescibed by the board; . pass an examination, prepared or approved by the examining committee, that may, in the discretion of the committee, include questions or tests on each of the following subjects, that is to say, anatomy, physiology, neurology, psychology, general diagnosis including symptomatology, and the principles and practice of the methods of speech and hearing therapy; and . comply with those provisions of the regulations that concern admission and registration.

APPENDIX IV - BIBLIOGRAPHY

REPORTS

Division of Health Services Research and Development, University of British Columbia, Audiologists and Speech/Language Pathologists in British Columbia - 1979, The Results of a Survey of Members of the B.C. Speech and Hearing Association, Report R:11, February 1980.

Health and Welfare Canada, Clinical Guidelines in Language Speech Pathology and Audiology, March 1980.

Inter-Agency Committee on Speech, Language and Hearing Services, Brief from the Inter-Agency Committee on Speech, Language and Hearing Services, Alberta, March 1975.

Edmonton Catholic School District, Pupil Personnel Services, Future Directions for Pupil Personnel, September 1979.

Alberta Social Services and Community Health.

MacKenzie, E.H., Evaluation of Speech, Language and Hearing Screening Procedures for 4 1/2 to 5 1/2 Year Old Children, November 1980.

Stensland, D.W.; Church, Dr. J.; Lackny, L., Report of the Interdepartmental Working Party on Speech, Language and Hearing Services in Alberta, March 1979.

The Manitoba Speech and Hearing Association, The Need for Programs in Human Communication Disorders in Manitoba, January 1979.

The Manitoba Speech and Hearing Association, Proposal for the Establishment of a Training Program in Communication Disorders at the University of Manitoba, March 1980.

Saskatchewan Department of Health, Working Party on Speech Therapy, Report to the Director of Regional Services Saskatchewan Department of Health of the Working Party on Speech Therapy, December 1975.

Saskatchewan Department of Health, Community Health Services Branch, Report of the Speech Therapy Review Committee, May 1979.

Speech and Hearing Association of Alberta, Summary of Responses to the Report of the Interdepartmental Working Party on Speech, Language and Hearing Services in Alberta, February 1981.

ARTICLES AND PAPERS

Alberta Social Services and Community Health, Response to the Comments of the Speech and Hearing Association of Alberta on the Report of the Interdepartmental Working Party on Speech, Language and Hearing Services in Alberta, 1980.

American Speech-Language-Hearing Association, Fact Sheet on Hearing and Speech Problems, January 1980.

Leske, M.C., "Prevalent Estimates of Communicative Disorders in the U.S.", American Speech, Language, Hearing Association, March 1981.

Government of Manitoba, Department of Health, A Comprehensive Hearing Conservation Program for the Winnipeg Region, 1981.

Manitoba Speech and Hearing Association, Status Report on Audiology and Speech Therapy in Manitoba.

Illerbrun, D.W., "Speech Therapy Needs in Saskatchewan Survey", Saskatchewan Journal of Education Research and Development, University of Saskatchewan, Vol. 6, No. 1, Fall 1975.

PROVINCIAL HEALTH MANPOWER REFERENCE SOURCES

BRITISH COLUMBIA

- Rollcall 79 - A Status Report of Health Personnel in the Province of British Columbia.
  Report R:12
  Division of Health Services Research and Development
  Health Sciences Centre,
  University of British Columbia.

- Rollcall Update 80 - A Status Report of Selected Health Personnel in the Province of British Columbia.
  Report R:16
  Division of Health Services Research and Development
  Health Sciences Centre,
  University of British Columbia.

ALBERTA

Health and Social Service Manpower in Alberta 1980

Alberta - Health and Social Services
Disciplines Committee.

SASKATCHEWAN

Annual Report 1978 - Saskatchewan Health Manpower

Saskatchewan Health.

MANITOBA

Health Manpower Provincial Report - Manitoba 1980.

Manitoba - Department of Health
Research Section.

Saskatchewan Speech and Hearing Association, Saskatchewan Speech and Hearing Association Position Paper on Speech Aids, March 1981.

Saskatchewan Speech and Hearing Association, Program Based Management Information Systems, Program Overview, April 1980.

Province of
British Columbia

Province of
Alberta

Province of
Saskatchewan

Province of
Manitoba

WESTERN CANADA
HEALTH MANPOWER TRAINING STUDY

Category # 3 Report XI
DENTAL OCCUPATIONS

Report XI - DENTAL OCCUPATIONS
Report XII - DIETICIANS

REPORT XI

DENTAL OCCUPATIONS MANPOWER

THE REQUIREMENT FOR ALTERNATIVE TRAINING

AND FUNDING ARRANGEMENTS IN WESTERN CANADA

REPORT XI

DENTAL OCCUPATIONS MANPOWER

TABLE OF CONTENTS

PAGE

I. INTRODUCTION

Study Background....1
Study Objectives....1
Study Approach....2
Occupation Definition....4

II. TRAINING NEEDS IN WESTERN CANADA

Manpower Requirements....6
Existing Training Programs....11
Occupational Issues....11

III. TRAINING RESPONSES

Decision Process....19
Timing and Location of Manpower Requirements....19
Indicated Manpower Responses....26
Defined Alternative Locations....29

IV. RECOMMENDATIONS....32

APPENDIX I - Study Approach and Methodology
APPENDIX II - Provincial Net Manpower Requirement
APPENDIX III - Scope of Practice
APPENDIX IV - Bibliography

I. INTRODUCTION

STUDY BACKGROUND

The provision of effective health services to the community is, to a considerable degree, dependent on three essential resources:

- o an adequate supply of well trained specialist staff in each health occupation group
- o the development of adequate facilities to service the community
- o the availability of adequate funds to ensure cost-effective and efficient health services.

The range and complexity of health treatment programs has expanded greatly in Canada during the last twenty-five years. In addition, changing technology and the development of new treatment programs have resulted in an increased requirement for skilled, adequately trained health manpower. These factors have resulted in an increased emphasis on manpower planning and skill training for health occupations to ensure an adequate supply of trained practitioners to meet defined manpower requirements.

STUDY OBJECTIVES

The Western Canada Health Manpower Training Study was initiated by the western Premiers at their annual conference in 1980. The study terms of reference contain two major objectives. These are:

- o to assess the existing and future needs for health manpower training programs and facilities in western Canada

- to make recommendations for the rationalization of the location and funding of health manpower training programs and facilities in western Canada.

STUDY APPROACH

The study was under the direction of a Steering Committee consisting of health and education representatives from the provinces of British Columbia, Alberta, Saskatchewan and Manitoba. The study took place over two years and consisted of a review of 26 health occupations grouped into five categories. Each occupation has been studied separately and a report has been produced for each. In addition, a report examining the inter-relations of the occupations has been submitted to the Steering Committee.

Data was collected from provincial and national associations and from government agencies for each of the occupations on the numbers of individuals registered with the associations and their current status as active or inactive practitioners. An attempt was also made to gather data on historical trends, the number of graduates from training, trends in movement of active practitioners to inactive status, occupational shifts out of the profession, trends in migration to and from other provinces, and immigration and emigration.

In the cases where validated and reliable information was not available, association spokesmen, employers and individuals in each of the occupations were interviewed to provide opinions regarding present and future trends affecting the manpower supply and requirement.

A literature review was conducted to examine the problems facing each occupation. A bibliography of the material reviewed is contained in Appendix D.

A health manpower computer model was developed to assist in the preparation of projections on the future supply and requirement for each occupation. A critical analysis of these twenty-year projections was then undertaken to develop the various supply and requirement scenarios presented in this report.

Separate documents describing the manpower planning methodology and the training decision-making process were issued. A brief summary of the overall study approach and methodology is set out in Appendix I and details of the provincial net requirements are set out in Appendix II.

OCCUPATION DEFINITION

This report addresses the need for training programs for dentists, dental hygienists and dental assistants in each of the four provinces. For the purpose of this study a Dentist is defined as a person who:

"diagnoses and treats diseases, injuries and malformations of teeth, gums and related oral structures and prescribes and administers preventive procedures. Examines teeth, gums and other tissues, using x-rays and dental equipment. Diagnoses condition and plans treatment. Administers local or general anaesthetic. Fills cavities with amalgam, silver, gold or other material. Replaces portion of tooth crown with inlay or artificial crown. Performs minor oral surgery, including extractions of erupted and impacted teeth. Takes dental impressions. Designs bridgework and partial or complete dentures. Constructs dental appliances or writes specifications for dental technician. Cleans teeth. Instructs patients in oral hygiene to prevent dental problems. Monitors growth pattern of patient's teeth. Refers patients to specialists."[1]

A Dental Hygienist is defined as a person who:

"provides preventive dental services and instructs patients in care of teeth and mouth. Scales and polishes teeth to remove hard and soft deposits, using dental instruments and equipment. Polishes fillings to remove tarnish and corrosion, using motorized apparatus. Applies topical agents and sealants to teeth to reduce decay. Conducts preliminary dental examination and record case history of patient. Records observed conditions and information for diagnosis and treatment planning by dentist. Instructs individuals and groups in home dental care and provides dietary counselling related to dental health. Exposes, processes and mounts dental x-ray films. Takes impressions of teeth for study models. Administers local anaesthetics, places, finishes and polishes fillings and removes sutures as permitted by training and by provincial legislation."[2]

---

1. Canadian Classification and Dictionary of Occupations - No. 3113, 1980 Revision.
2. Canadian Classification and Dictionary of Occupations - No. 3157, 1980 Revision.

A Dental Assistant is defined as a person who:

"assists dentist in care and treatment of patients. Seats and prepares patient for dental treatment. Arranges instruments, materials and medication and hands them to dentist. Keeps oral operating area clear during dental procedure, using suction devices, water sprays, cotton rolls and holders and by retraction of cheek and tongue. Prepares filling materials, using mechanical amalgamator and instruments and supplies them to dentist as required. Comforts patient through reassuring conversation and action. Gives emergency treatment, as directed by dentist, for local and systemic distress. Advises patients on post-operative care, oral hygiene and importance of diet and preventive dentistry. Sterilizes instruments, using ovens, autoclaves and aspetic solutions. Pours, trims and mounts plaster models from impressions taken by dentist and performs other dental laboratory procedures. Performs routine maintenance duties such as lubricating equipment, sharpening dental instruments, replacing expendable parts and cleaning equipment and treatment area. Exposes, processes and mounts x-ray films. Polishes teeth, applies fluoride to teeth and performs other interoral procedures, as permitted by training and provincial legislation. Acts as receptionist, if required."[3]

---

3. Canadian Classification and Dictionary of Occupations - No. 3157, 1980 Revision.

II. TRAINING NEEDS IN WESTERN CANADA

This section presents the statistical data for manpower requirements for western Canada, reviews the basis for projection and the confidence in basic data, outlines existing training programs for the dental occupations and reviews major issues influencing the occupation.

MANPOWER REQUIREMENTS

Manpower Supply - Historical Trends and Future Projections

The projection of the future supply of dental occupations has been based on historical data, and assumptions based on estimates obtained from professional associations. In the absence of specific historical data these estimates have been used to project future trends.

The historical trend for supply in dental hygiene and dental assistant differs from the projected forecast trends. This illustrates the sensitivity of manpower supply to changes in the complex factors which will affect, or influence the availability of manpower, (ie., migration patterns, labour turnover including movement from active to inactive status, fluctuations of training outputs). In the absence of key information it has proven extremely difficult to assess or determine the reasons for historical supply trends. Traditionally those occupations with a relatively short period of training (1 or 2 years), have been subject to periodic fluctuations in manpower supply. This may reflect, to a degree, the periodic changes in training outputs. Other factors which affect the availability of key manpower resources will include the labour market supply situation (the difference between the total number of qualified practitioners and the number employed), and patterns of labour force participation.

The projections of future manpower supply have been based on certain key assumptions which may vary from the historical situation. The most sensitive factor which controls supply is labour turnover and the movement from active to inactive practice. This factor is partially determined by economic factors, labour market situation, and other social factors. In addition, manpower supply is susceptible to periodic fluctuations in migration and immigration rates. Traditionally the health occupations have enjoyed a high degree of mobility and the labour market situation is one province may have a direct influence on the supply of practitioners in other provinces. The supply projections in this report have been prepared to indicate long term manpower trends based on certain key assumptions. As part of the sensitivity analysis conducted during the study a number of these assumptions were critically assessed to determine their impact on future supply. Where appropriate these changed assumptions have been commented on.

The supply projections discussed below provide a framework for evaluating training and other manpower strategies. These projections should be monitored carefully and compared to current information derived from vacancy surveys. Care must be taken, however, to recognize that the projections provide a reference point by which to assess the current manpower situation. In order to correctly interpret manpower trends, however, it will be necessary to carefully monitor each of the factors which affect manpower supply, and to compare the factors with the assumptions used to project supply. It is anticipated that the projected manpower requirements will not exactly balance with the actual situation at any given point in time. The manpower requirements contained in this report equate to 31 December in each calendar year.

EXHIBIT I

NET MANPOWER REQUIREMENTS: WESTERN CANADA REGION

BY ALTERNATIVE SCENARIO - DENTISTS

		PROJECTED REQUIREMENTS		
YEAR	STOCK	MOST LIKELY SCENARIO SERVICE TARGET 1:2000	SERVICE TARGET 1:1800	CURRENT POPULATION RATIO
1981	3432	3433	3816	3390
NET		1	384	-42
1985	3876	3751	4168	3709
NET		-125	292	-167
1990	4511	4112	4571	4075
NET		-399	60	-436
1995	5174	4449	4911	4414
NET		-725	-263	-760
2000	5762	4761	5291	4726
NET		-1001	-471	-1036

Dentists

Exhibit I, opposite, shows the projected stock and requirements for dentists in western Canada during the period 1981-2000.

Methodology

The most likely scenario has been based on an assumption of the service target ratio of 1:2,000 population. In addition, the manpower requirements under service target ratio of 1:1,800 population and under the current population ratio are also shown in Exhibit 1, opposite. Under each of the three alternative scenarios there is the potential for a surplus of dentists in western Canada in the forecast period. In addition, because of the unique dental care programs in the Province of Saskatchewan, a sensitivity analysis was conducted to evaluate the long term manpower requirements under a reduced requirement for dentists.

Dental Hygienists

Exhibit II, following, shows the projected stock and requirements for dental hygienists in western Canada during the period 1981-2000.

Methodology

The most likely scenario has been based on a continuation of the current pattern of utilization of dental hygienists by dentists in western Canada. The current ratio of hygienists to dentists has been projected based on the future manpower requirements for dentists derived using a ratio of 1:2,000. Alternative manpower requirements are presented based on a continuation of the current ratio of dental hygienists to dentists and a service target ratio of 1:1,800 for dentists and also on a continuation of the current population ratio for dental hygienists. Using the service target ratio for

EXHIBIT II

NET MANPOWER REQUIREMENTS: WESTERN CANADA REGION

BY ALTERNATIVE SCENARIO - DENTAL HYGENISTS

		PROJECTED REQUIREMENTS		
YEAR	STOCK	DENTISTS AT 1:2000	DENTISTS AT 1:1800	CURRENT POPULATION RATIO
1981	1117	1097	1220	1072
NET		-20	103	-45
1985	1273	1205	1348	1179
NET		-68	75	-94
1990	1479	1326	1476	1299
NET			3	
1995	1606	1440	1602	1413
NET		-166	-4	-193
2000	1703	1547	1719	1518
NET		-156	16	-185

EXHIBIT III

NET MANPOWER REQUIREMENTS - WESTERN CANADA REGION

BY ALTERNATIVE SCENARIO - DENTAL ASSISTANTS

		PROJECTED REQUIREMENTS			
YEAR	STOCK	DENTISTS AT 1:2000	DENTISTS AT 1:1800	CURRENT POPULATION DENTISTS	CURRENT POPULATION DENTAL ASST.
1981	3695	4088	4480	3758	3749
NET		393	785	63	54
1985	4376	4432	4925	4085	4079
NET		56	549	-291	-297
1990	4931	4726	5281	4459	4447
NET		-205	350	-472	-484
1995	5309	5185	5765	4807	4826
NET		-124	456	-502	-483
2000	5513	5521	6135	5127	5158
NET		8	622	-386	-355

dentists of 1:2,000 and the current population ratio there is a surplus of dental hygienists in western Canada in the forecast period.

Dental Assistants

Exhibit III, opposite, shows the projected stock and requirements for dental assistants in western Canada during the period 1981-2000.

Methodology

Four different approaches have been used to project the manpower requirements for dental assistants in western Canada. There is limited data on the current stock of practitioners in Saskatchewan and Manitoba. Consequently, although each approach was used to determine requirements for these provinces, the selection of a most likely scenario for net manpower requirements varies by province.

In British Columbia and Albera the most likely scenario for manpower requirements has been based on the current ratio of dental assistants to dentists. In Saskatchewan and Manitoba, because of the limited data available, it was considered that this approach exaggerated the manpower requirements, and consequently the most likely scenario has been based on the current population ratio. Specific discussions of the provincial net manpower requirements is contained in Section III below.

Based on the most likely scenario selected for each province there is a potential surplus of practitioners for the western Canada region.

Degree of Confidence in Data

Projections of manpower supply for dentists, dental hygienists and dental assistants has been prepared based on current manpower stock, net

immigration, net migration, occupational shifts (including active/inactive movements), training outputs and attrition. The following comments indicate the overall degree of confidence in each of the assumptions made regarding the factors for each occupation.

Dentists

There is currently mandatory registration for dentists in each of the provinces in western Canada. The provincial colleges of Dentists and Dental Surgeons maintain accurate records of practitioner registrations and of practitioner manpower movements. It is therefore considered that the information derived for this occupation has an acceptable level of accuracy.

Dental Hygienists

The information on manpower movements for dental hygienists has been derived from association records. The provincial colleges of Dentists and Dental Surgeons, and the provincial Dental Hygienists associations maintain accurate records of practitioner registrations and movements. In addition, there is recent data available from a national survey conducted by the Faculty of Dentistry, University of Toronto. It is therefore considered that the information derived for this occupation has an acceptable level of accuracy.

Dental Assistants

There is no mandatory requirement for registration of dental assistants in the provinces of Alberta and Saskatchewan and the provincial association records are not representative of all dental assistants employed. The manpower supply information for this occupation has been based on a number of assumptions and estimates gathered from associations and the manpower projections derived from this information are as accurate as can be achieved given the absence and softness of basic manpower data. The absence of key

TABLE 1

EXISTING TRAINING PROGRAMS - WESTERN CANADA

DENTAL OCCUPATIONS

PROVINCE	PROGRAMS	ESTIMATED ANNUAL OUTPUT
DENTISTS		
British Columbia:	1	40
Alberta:	1	47
Saskatchewan:	1	19
Manitoba:	1	30
DENTAL HYGENISTS		
British Columbia:	1	20
Alberta:	1	32
Saskatchewan:	1	10
Manitoba:	1	25
DENTAL ASSISTANTS		
British Columbia:	8	200
Alberta:	2	140
Saskatchewan:	2	80
Manitoba:	3	85

Note: for Dental Assistants

In addition to the projected training outputs from college based training programs there is a Correspondence Course provided by the Continuing Education Division of the Northern Alberta Institute of Technology. Estimated annual outputs from these programs are:

B.C.	60	Saskatchewan	3
Alberta	55	Manitoba	1

planning data limited the approaches used to project manpower requirements, and no consistent approach was developed.

EXISTING TRAINING PROGRAMS

The existing training programs for dentists, dental hygienists and dental assistants are shown in Table I , opposite.

In addition to the college based training programs for dental assistants in western Canada, there is the National Correspondence Course provided by the Continuing Education Division of the Northern Alberta Institute of Technology. Estimates of annual output from this program indicate that British Columbia will graduate approximately 60 per annum, Alberta approximately 55 per annum, Saskatchewan 3 per annum, and Manitoba 1 per annum. More detailed discussion of these training programs is contained in Report 3-A "The Scope of Existing Training Programs - Category III Occupations.

OCCUPATIONAL ISSUES

The supply and requirement for dental manpower in western Canada are influenced by a number of general trends and issues. These are:

Historical and Current Trends

- Potential Oversupply

  There is a growing concern that, for the first time, there is the potential for an oversupply of dentists at both the western regional and at the provincial level. The general indication is that there is a national surplus of dental manpower. This contrasts significantly with the position in the immediate post-war period when dentists and dental

auxiliaries were in short supply. Table II shows the changing pattern of dental manpower in western Canada and in the Province of Ontario. There has been a consistent increase in the availability of manpower and this is reflected in the changed ratio of practitioner to population.

o Increased Productivity

The potential surplus of manpower is further compounded by the increase in productivity which has resulted from changed organizational practice patterns and the impact of technological changes including the use of the high speed drill. In addition, productivity of dental practices has been directly influenced by the availability of dental auxiliary manpower and the increase in employment opportunities for auxiliaries.

o Changing Practice Patterns/Technological Change

The extent of future technological change is difficult to assess since it will involve a major reorientation of practice patterns. The indication, however, is that the trend towards group practice is likely to continue in this decade.

o Increased Capacity in Dental Care System

The net effect of the increase in productivity and the increase in the number of practitioners is a direct increase in the potential capacity of the dental care system.

o Improved Dental Health

At the same time the increased emphasis on preventive dental care and the use of fluoridation processes has generally resulted in improved dental health. The percentage of endentulous population has declined. This tendency to keep natural teeth longer will potentially result in an increased demand for dental services in an aging population.

o Future Demand for Dental Services - Trend in Insured Services

The future demand for dental services is difficult to anticipate. The rapid increase in third party dental insurance coverage in Canada has resulted in a high proportion of the population having access to dental care. It is estimated that in 1980 approximately 7.6 million Canadians were covered by third party dental insurance programs. Of this group approximately 65% were covered by private sector insurance programs. In 1975 approximately 2.0 million Canadians were covered by dental insurance programs. The future increases in insured dental benefits are difficult to estimate because of recent changes in taxation laws.

Research has indicated, however, that the development of third party coverage does not necessarily result in an increased demand for dental care, as demand for services and economic and physical accessability appear to be unrelated. Information obtained from Statistics Canada (Table 62 - 547 (1976)), indicates that the usage of dental insurance programs in in part dependent on socio-economic group. In the income group $10,000-$12,000, 51% of insured families used the dental services available. This contrasts with the income group $20,000-$24,000, were 72% of eligible families used the benefits, and the income group $35,000 + were 80% of eligible families used the insured benefits.

In this study consideration of future levels of insured dental benefits, and increased demand for dental services have been considered. As a result of the inadequate service utilization data, however, no attempt has been made to determine future demand for services by age and sex of recepient. The existing data base information obtained from dental insurers is inadequate. In summary, the impact of changes in either the level of insurance, the range of services covered, or increases in the number of people covered by third party dental insurance programs is unknown, and any estimates of future manpower requirements based on these factors would be subjective.

o Future Demand for Dental Services - Improved Dental Health

In addition to the impact of insured dental services, the future demand for dental services will be influenced by the improved dental health of Canadians. The increased emphasis of preventative dentistry, and the use of fluridation processes has had a beneficial affect, and it has been suggested that the population will keep natural teeth longer. This will affect the pattern of dental care, (less removal of teeth, and less need for oral prosthetis and increased emphasis on related oral disease), and it is likely that the most significant factor affecting the demand (i.e., number of services), will be the increase in population.

o Impact of Oversupply of Dentists

Given the potential for an oversupply of dental manpower in Canada there is growing concern within the profession that there may be already surplus dental capacity.

An arbitrary criteria has been used to assess the demand for dental services and this indicates that the waiting time for dental

appointments has drastically reduced in the last five years. Thus, typically, in major urban areas it is possible to make appointments with a minimum of delay. While this has important implications for the consumer of dental services, it is seen as an indicator that the surplus capacity is threatening traditional earning potential and practice patterns.

o Impact of Oversupply of Dentists on Dental Auxiliaries

The implications of this potential oversupply of dentists are important to recognize, in that the demand for dental auxiliary manpower is directly related to the availability of dentists. In many instances the skills of the dentist and dental hygienist overlap. It is reasonable to assume that as the number of dentists increases to a surplus situation, the potential number of dental auxiliaries will either remain static or potentially decline. Thus the future for training auxiliary dental manpower in western Canada is directly influenced by the supply of dentists.

o Potential Impact of Training Decisions on Migration Rates

Given the potential oversupply of dentists at a national level, the implications of changes in manpower supply in eastern Canada will also have a direct bearing on the western Canada regional manpower situation. It is understood that currently discussion is taking place on the potential to limit or reduce enrolments into dentistry training programs in Ontario. As yet no decision has been made, although it is clear that any reductions in enrolments would have a long term implication on the migration rates into western Canada and particularly into the province of British Columbia and Alberta. It is significant to note that Ontario is currently at the recommended service target ratio of 1:2,000 dentists.

o Proportion of Female Practitioners

Dentistry has never been an occupation exclusive to males, but in recent years the trend for females to enter the profession has increased significantly. At present it is estimated that approximately 5% of the dentists in western Canada are female. In addition, it is estimated that approximately 30% of recent graduates are female. This will result in an increased number of female practitioners in the future, and the profession should be closely monitored to determine the effect of this increase on labour force participation rates and the mobility pattern for this occupation. In contrast it is estimated that approximately 99% of dental assistants, and 98% of dental hygienists are female. There is no evidence to suggest that males are entering, or will enter these occupations in the future.

o Pattern of Employment - Part Time Work

It has been assumed that the majority of dentists work full time, and no adjustments have been made to compensate for reduced hours of work.

Although the Alberta vacancy survey shows that approximately 40% of active dental hygienists work part-time, an employment profile for dental hygienists in Canada estimated that on average, dental hygienists work 31 hours per week, and that 50% worked in excess of 34 hours per week. Given this pattern of working, no attempt has been made to calculate full time equivalent practitioners for dental hygiene.

The Alberta vacancy survey shows that the majority of dental assistants work full time. Only 7.7% of formally trained dental assistants work part-time, and the hours of work for these part-time practitioners are not known. Consequently, no attempt has been made to calculate full time equivalent practitioners for dental assistants.

Situations Likely to Occur with Major Policy Changes

- Independent Practice for Dental Hygienists

With the exception of the province of Alberta, dental hygienists must work under the general direction of a supervisory dentist. Members of the dental hygienists profession consider this to be an unrealistic constraint of the development of the profession and are seeking amended legislation to allow dental auxiliaries to establish private independent practices. The impact of this change on the future manpower requirements for dental hygienists has not been evaluated.

- Trend to Formal Training for Dental Assistants

The generic title of dental assistants can be subdivided into those trained by dentists in their offices (on-the-job trained) and those trained in the formal setting (either classroom or by correspondence). With the increased sophistication of dental care and the expanding technology, it is anticipated that on-the-job trained assistants may be replaced by assistants who have received formal training.

- Potential to Control Manpower Movements

The potential to limit migration of dental manpower into overserviced areas could be exercised through control of the right to bill for certain procedures. This could influence patterns of manpower mobility and provide incentive for practitioners to establish in underserviced areas. Currently, however, there is no indication that government, or private sector insurance companies are introducing any constraints on the right to bill. Although a sensitivity analysis was used to determine the effects of changes in migration rates on manpower supply, it has been assumed that these changes would result from recognition by

dentists of the limitation of establishing practice in areas of oversupply. It is assumed that dentists will seek to develop practices in areas of demand. The basis for this assumption must be reviewed, and patterns of movement for dentists should be carefully monitored over the next five years.

o Interchangability of Dental Auxiliary Manpower

The roles of the dental hygienist, dental assistant and dental nurse are, to a degree, interchangeable. Although training modules have ben made available in Saskatchewan and Manitoba to add dental hygiene skills to dental nursing qualifications, there is no data available to determine the affect of one dental auxiliary occupation on the other. No attempt has been made in this study to examine the interchangeability of dental auxiliary manpower, or to determine the potential impact on future manpower requirements.

EXHIBIT IV-1

DENTISTS - BRITISH COLUMBIA

NET MANPOWER REQUIREMENTS: BY PROVINCE
BY ALTERNATIVE SCENARIO

	PROJECTED REQUIREMENTS			
	CURRENT POPULATION	SERVICE TARGET RATIO		
SUPPLY	1:1634	1:2000	1:1900	1:1800
1981 - 1663	1636	1337	1407	1485
Net	(27)	(326)	(256)	(178)
1982 - 1721	1670	1365	1436	1516
Net	(51)	(356)	(285)	(205)
1983 - 1778	1704	1392	1465	1547
Net	(74)	(386)	(313)	(231)
1984 - 1835	1738	1420	1495	1578
Net	(97)	(415)	(340)	(257)
1985 - 1892	1772	1448	1524	1609
Net	(120)	(444)	(368)	(283)
1990 - 2222	1939	1584	1668	1760
Net	(283)	(638)	(554)	(462)
1995 - 2552	2089	1707	1797	1897
Net	(463)	(845)	(755)	(655)
2000 - 2827	2221	1815	1910	2017
Net	(606)	(1012)	(917)	(810)

III. TRAINING RESPONSES

DECISION PROCESS

The decision process outlined in Appendix I and discussed in detail in Report C, "A Decision Process To Evaluate the Location of, and Funding Arrangements For Health Occupation Training Programs in Western Canada", was used to evaluate the training implications of the net manpower requirements for dentists, dental hygienists and dental assistants discussed in Section II, above. This section contains the results of this analysis.

TIMING AND LOCATION OF MANPOWER REQUIREMENT

DENTISTS

Exhibits IV-1, IV-2, IV-3 and IV-4 show the projected net manpower requirements for Dentists for the period 1981-2000 for each of the four western provinces under alternative scenarios. In each of the provinces the service target ratio of 1:2000 has been adopted as the most likely scenario. Under this assumption there is a significant surplus of dentists in British Columbia, the potential for a minimal surplus in Saskatchewan and Manitoba and a requirement for approximately 10 additional practitioners per year throughout the forecast period in Alberta. Discussion of the potential requirements follows.

British Columbia

British Columbia has a current population ratio for dentists of 1:1,634. Exhibit IV-1 shows that under all scenarios there is the potential for a significant surplus of dentists in the forecast period. Historically British Columbia has experienced a net increase in dentists of approximately 75 - 90 per annum. The training output of approximately 40 has been

EXHIBIT IV-2

DENTISTS - ALBERTA

NET MANPOWER REQUIREMENTS: BY PROVINCE
BY ALTERNATIVE SCENARIO

	PROJECTED REQUIREMENTS			
	CURRENT POPULATION RATIO	SERVICE TARGET RATIO		
SUPPLY	1:2144	1:2000	1:1900	1:1800
1981 - 1003	1005	1077	1134	1197
Net	2	74	131	194
1982 - 1025	1044	1118	1178	1243
Net	19	93	153	218
1983 - 1059	1085	1163	1224	1292
Net	26	104	165	233
1984 - 1092	1123	1204	1268	1338
Net	31	112	176	246
1985 - 1125	1157	1241	1306	1379
Net	32	116	181	254
1990 - 1277	1319	1413	1488	1571
Net	42	136	211	294
1995 - 1449	1474	1580	1663	1756
Net	25	131	214	307
2000 - 1578	1625	1742	1834	1936
Net	47	164	256	358

increased by a significant inflow of dentists into the province through migration and immigration. This trend could be significantly affected by any cutback in training outputs in Ontario and by a realization among members of the profession that the opportunities to either establish a practice or associate in an existing practice are limited by the current supply of dental manpower in the province. Several alternative assumptions on reduced migration and immigration were assessed and it is apparent that even if the rate of inflow into the province was reduced by 50% the surplus of dentists would continue in the forecast period. Therefore although the assumption of a reduced rate of migration into the province would partially reduce the projected surplus, it will be necessary to reduce training outputs in British Columbia to limit the number of new dentists entering the labour market.

Alberta

Alberta has a current population ratio for dentists of 1:2,144. Exhibit IV-2 shows that under all scenarios there is the potential for a requirement for additional dentists throughout the forecast period. Historically, however, there has been minimal movement into the province through migration. The projected net manpower requirements shown in Exhibit IV-2 have been derived on the assumption that this trend will continue in the future. However if the rate of migration into the province were to increase to 10 per year the projected manpower requirements would be met under a service target ratio of 1:2,000. Factors which will affect the rate of migration are the potential cutback in training for dentists in Ontario, the projected reduction in the rate of migration into British Columbia and the potential economic and population expansion in Alberta. The assumption of an increase in the number of dentists entering the province through migration should be carefully monitored over the next three years.

EXHIBIT IV-3

DENTISTS - SASKATCHEWAN

NET MANPOWER REQUIREMENTS: BY PROVINCE
BY ALTERNATIVE SCENARIO

	PROJECTED REQUIREMENTS					
	CURRENT POPULATION RATIO	SERVICE TARGET RATIO				
SUPPLY	1:2987	1:2400	1:2200	1:2000	1:1900	1:1800
1981 - 335	327	390	440	488	514	543
Net	(8)	55	105	153	179	208
1982 - 346	332	396	445	495	521	551
Net	(14)	50	99	149	175	205
1983 - 358	337	402	453	503	529	559
Net	(21)	44	95	145	171	201
1984 - 376	343	408	459	510	537	567
Net	(34)	32	83	134	161	191
1985 - 398	347	414	466	518	545	575
Net	(51)	16	68	120	147	177
1990 - 504	370	442	498	553	582	615
Net	(134)	(62)	(6)	49	78	111
1995 - 615	392	468	527	585	616	650
Net	(223)	(147)	(88)	(30)	(1)	35
2000 - 752	411	553	553	614	646	682
Net	(341)	(261)	(199)	(138)	(106)	(70)

EXHIBIT IV-4

DENTISTS - MANITOBA

NET MANPOWER REQUIREMENTS: BY PROVINCE
BY ALTERNATIVE SCENARIO

	PROJECTED REQUIREMENTS			
	CURRENT POPULATION RATIO	SERVICE TARGET RATIO		
SUPPLY	1:2515	1:2000	1:1900	1:1800
1981 - 431	422	531	559	591
Net	(9)	100	128	160
1982 - 435	424	534	562	595
Net	(11)	99	127	160
1983 - 437	427	537	568	600
Net	(10)	100	139	163
1984 - 450	430	541	569	601
Net	(20)	91	119	151
1985 - 461	433	544	573	605
Net	(28)	83	112	144
1990 - 508	447	562	592	625
Net	(61)	54	84	117
1995 - 558	459	577	608	642
Net	(99)	19	50	84
2000 - 605	469	590	621	656
Net	(136)	(15)	16	51

Saskatchewan

Saskatchewan has a current population ratio for dentists of 1:2,987. Exhibit IV-3 shows that under all the scenarios there is the potential for a minimal surplus by the year 2000. By 1995, however, the net manpower requirements under a service target ratio of 1:2,000 are approximately balanced. Traditionally there has been a net inflow into the province through immigration and it is anticipated that, as the number of dentists born and trained in Saskatchewan increases, this inflow from immigration will reduce.

The province of Saskatchewan has developed a pattern of dental care service which utilizes a wide range of dental auxiliaries. The role of the dental nurse was developed to supplement other auxiliaries, and to reduce the requirement for dentists. Therefore the service target ratio of 1:2,000 may not be appropriate for Saskatchewan, if the current pattern of utilization of dental auxiliaries continues. In order to determine the impact on projected net manpower requirements sensitivity analysis was used to determine the impact of target ratios of 1:2,200 and 1:2,400.

Based on a service target ratio of 1:2,400, there is a potential surplus of dentists by 1990.

Manitoba

Manitoba has a current population ratio for dentists of 1:2,515. Exhibit IV-4 opposite shows that the net manpower requirements are approximately in balance by the year 2000. Historically Manitoba has had a net loss of manpower through migration and if the rate of outward migration were to reduce there is the potential for a minimal surplus in the 1990's.

EXHIBIT V

RATIO OF DENTAL HYGIENISTS TO DENTISTS 1973-1980

YEAR	BRITISH COLUMBIA	ALBERTA	SASKATCHEWAN	MANITOBA	ONTARIO
1973	1:5.43	1:3.23	1:6.28	1:3.33	-
1974	1:5.56	1:2.12	1:6.56	1:2.88	-
1975	1:4.89	1:2.36	1:6.32	1:2.82	-
1976	1:4.99	1:2.47	1:6.44	1:2.83	1:7.5
1977	1:4.64	1:1.93	1:6.84	1:2.69	1:5.5
1978	1:4.71	1:2.06	1:6.2	1:2.62	1:4.71
1979	1:4.41	1:2.22	1:6.3	1:2.46	1:3.92
1980	1:3.86	1:2.37	1:5.87	1:2.48	1:3.42

EXHIBIT V-1

DENTAL HYGIENISTS - BRITISH COLUMBIA

NET MANPOWER REQUIREMENTS - BE ALTERNATIVE SCENARIO

		PROJECTED REQUIREMENTS		
YEAR	STOCK	DENTISTS AT 1:2000	DENTISTS AT 1:1800	CURRENT POPULATION
1981	424	346	385	423
Net		-78	-39	1
1985	530	375	417	458
Net		-155	-113	-72
1990	633	410	456	501
Net		-223	-177	-132
1995	712	442	491	540
Net		-270	-221	-172
2000	773	470	522	574
Net		-303	-251	-199

DENTAL HYGIENISTS

Exhibit V, opposite, shows the historical and current relationship of dental hygienists to dentists. It should be noted that the Association data indicated that there were 409 active members in Alberta in 1980. The March 1981 vacancy survey indicated that there were 88 vacancies in the province. Therefore the theoretical number of budgeted dental hygiene positions in Alberta is 497, or a ratio of 1 dental hygienist to 1.95 dentists. Exhibits V-1, V-2, V-3 and V-4 show the projected net manpower requirements for dental hygienists for the period 1981-2000 for each of the western provinces under alternative scenarios. In each scenario the current ratio of dental hygienists to dentists was applied to the projected requirement for dentists derived under varied target ratios. In addition, the sensitivity of the assumption on the ratio of dental hygienists to dentists was assessed to determine the effect of increased utilization of dental hygienists on future manpower requirements. Assumptions of 10%, 15% and 25% increase in utilization of dental hygienists were evaluated to determine future manpower requirements. There is a projected surplus of dental hygienists in British Columbia, a minimal surplus in Saskatchewan and Manitoba and a requirement for approximately 22 additional practitioners per year in Alberta. Discussion of the provincial requirements follow.

British Columbia

Exhibit V-1, opposite, shows the projected net manpower requirements for dental hygienists. Based on an assumption that the ratio of 1 dentist to 1,800 population is a practical projection and that the current level of utilization of dental hygienists continues there is the potential for a surplus of approximately 10 dental hygienists per year throughout the forecast period. If the demand for dental hygienists were to increase, this minimal surplus would be utilized effectively.

EXHIBIT V-2

DENTAL HYGIENISTS - ALBERTA

NET MANPOWER REQUIREMENTS - BY ALTERNATIVE SCENARIO

YEAR	STOCK	PROJECTED REQUIREMENTS					
		DENTISTS[1] 1:2000 AT		DENTISTS[1] 1:1800 AT		CURRENT POPULATION[2] RATIO	
		1:2.37	1:1.95	1:2.37	1:1.95	1:5090	1:4189
1981	418	454	552	505	614	423	514
NET		56	134	88	198	6	96
1985	443	523	636	589	707	487	591
NET		80	193	146	264	44	148
1990	470	595	725	663	805	555	674
NET		125	255	193	335	85	204
1995	490	665	810	741	900	621	754
NET		175	320	251	410	131	264
2000	502	734	893	817	992	685	832
NET		232	391	315	490	183	330

Note:

1 Manpower requirements for Dental Hygienists have been calculated at 1 dental hygienist per 2.37 dentists (based on 1980 Association estimates), and at 1 dental hygienist per 1.95 dentists (based on 1981 Vacancy Survey Data, Alberta Health and Social Service Manpower Monitoring System, March 31, 1981).

2 Current population ratio of 1:5090 is based on Association stock of 409. Current population ratio of 1:4189 is based on Vacancy Survey stock of 497.

EXHIBIT V-3

DENTAL HYGIENISTS - SASKATCHEWAN

NET MANPOWER REQUIREMENTS - BY ALTERNATIVE SCENARIO

		PROJECTED REQUIREMENTS		
YEAR	STOCK	DENTISTS AT 1:2000	DENTISTS AT 1:1800	CURRENT POPULATION
1981	63	83	92	56
Net		20	29	(7)
1985	92	88	98	59
Net		(4)	6	(33)
1990	121	94	105	63
Net		(27)	(16)	(58)
1995	143	100	111	67
Net		(43)	(32)	(76)
2000	160	105	116	70
Net		(55)	(44)	(90)

Alberta

Exhibit V-2, following, shows the projected net manpower requirements for dental hygienists. Based on an assumption of 1 dentist to 2,000 population and that the current level of utilization of dental hygienists continues there is a requirement for an additional 15 dental hygienists per year throughout the forecast period based on an assumption of 1 dental hygienist per 2.37 dentists, or a requirement for an additional 22 dental hygienists per year based on an assumption of 1 dental hygienist per 1.95 dentists. If the demand for dental hygienists were to increase through greater utilization of dental hygienists in the provision of dental care, this requirement would be for approximately 25 additional practitioners per year.

Saskatchewan

The current ratio of dental hygienists to dentists in Saskatchewan is 1:5.9, compared with Alberta 1:2.37. Exhibit V-3, opposite, shows the projected net manpower requirements for dental hygienists. Based on an assumption of 1 dentist to 2,000 population and that the current level of utilization of dental hygienists continues there is the potential for a minimal surplus of dental hygienists. However this surplus of dental hygienists would reduce the ratio of dental hygienists to dentists to 1:3.8. It is unclear if the low level of utilization of dental hygienists in Saskatchewan results from an undersupply of practitioners or from the absence of a long established training program. The module to train dental hygiene skills for dental nurses has resulted in a high level of flexibility and it is anticipated that the demand for dental hygienists will increase in the future.

Manitoba

Exhibit V-4, following, shows the projected requirements for dental hygienists. Based on an assumption of 1 dentist to 2,000 population and

EXHIBIT V-4

DENTAL HYGIENISTS - MANITOBA

NET MANPOWER REQUIREMENTS - BY ALTERNATIVE SCENARIO

		PROJECTED REQUIREMENTS		
YEAR	STOCK	DENTISTS AT 1:2000	DENTISTS AT 1:1800	CURRENT POPULATION
1981	178	214	238	170
Net		36	60	(8)
1985	208	219	244	175
Net		11	36	(33)
1990	238	227	252	180
Net		(9)	14	(58)
1995	261	233	259	185
Net		(28)	2	(76)
2000	279	238	264	189
Net		(41)	(15)	(90)

that the current level of utilization of dental hygienists continues there is the potential for a minimal surplus by the year 2000. If the demand for dental hygienists were to increase by 10% this surplus would be effectively utilized. It should be noted that the actual stock of dental hygienists in the province in the year 1981 is 191, an increase of 13 over the projected stock for the corresponding period. If this trend were to continue the potential surplus of practitioners would be realized earlier than anticipated.

DENTAL ASSISTANTS

Based on data available for 1980 the following ratios of dental assistants to dentist were used to calculate the requirement for dental assistants.

- British Columbia: 1:1.14
- Alberta: 1:1.16 (based on stock of 932 establish in Vacancy Survey)
  1:0.86 (based on Association stock of 836)
- Saskatchewan: 1:0.43
- Manitoba: 1:0.68

Exhibits VI-1, VI-2, VI-3, VI-4 show the projected net manpower requirements for dental assistants for the period 1981-2000 for each of the western provinces under alternative scenarios. In each scenario the current ratio of dental assistants to dentists was applied to the projected requirement for dentists derived under varied target ratios.

It should be noted that Association data indicated that there were 836 active members in Alberta in 1980. The March 1981 vacancy survey indicated that there were 96 vacancies for certified dental assistants in the province. Therefore the theoretical number of budgeted positions for certified dental assistants in Alberta is 932.

EXHIBIT VI-1

NET MANPOWER REQUIREMENTS - BY ALTERNATIVE SCENARIO

DENTAL ASSISTANTS - BRITISH COLUMBIA

		PROJECTED REQUIREMENTS			
YEAR	STOCK	DENTISTS AT 1:2000	DENTISTS AT 1:1800	CURRENT POPULATION	
1981	1508	1172	1302	1435	1430
NET		-336	-206	-73	-78
1985	1765	1270	1411	1554	1549
NET		-495	-354	-211	-216
1990	2004	1389	1463	1700	1695
NET		-615	-514	-304	-309
1995	2202	1497	1664	1832	1851
NET		-705	-538	-370	-351
2000	2303	1592	1769	1948	1942
NET		-711	-534	-355	-361

EXHIBIT VI-2

NET MANPOWER REQUIREMENTS - BY ALTERNATIVE SCENARIO

DENTAL ASSISTANTS - ALBERTA[1]

YEAR	STOCK	PROJECTED REQUIREMENTS						
		DENTISTS[1] 1:2000 AT		DENTISTS[1] 1:1800 AT		CURRENT POPULATION[2]		
						DENTISTS	DENTAL ASSTS.	
		1:1.16	1:0.86	1:1.16	1:0.86	AT	1:2233	1:2490
1981	836	1035	928	1150	1032	966	964	865
NET		199	92	314	196	130	128	29
1985	1141	1193	1070	1326	1190	1112	1110	996
NET		52	71	185	49	-29	-31	-145
1990	1378	1359	1218	1510	1354	1268	1265	1135
NET		-19	-160	132	-24	-110	-113	-243
1995	1518	1519	1270	1688	1362	1417	1414	1269
NET		1	-248	170	-156	-101	-104	-249
2000	1600	1675	1400	1861	1501	1562	1560	1399
NET		75	-200	261	-99	-38	-40	-201

1 Ratio of 1;1.16 is based on a theoretical number of 932 dental assistants, based on March 1981 vacancy survey data. Alberta Health and Social Service Manpower Monitoring System, March 31, 1981. Manpower requirements for Dental Assistants have been calculated at 1 dental assistant per 1.16 dentist, and 1 dental assistant per 0.86 dentists based on 1980 dental assistant association estimates.

2 Current population ratio of 1:2490 is based on Association stock of 836. Current population ratio of 1:2233 is based on Vacancy survey stock of 932.

There is a projected surplus of dental assistants in British Columbia and Manitoba, and a requirement for additional practitioners in Alberta and Saskatchewan. Discussion of the provincial requirements follow.

British Columbia

Exhibit VI-1, opposite, shows the projected net manpower requirement for dental assistants. Under each of the projections approaches used there is a surplus. This surplus is approximately 25-40 practitioners a year throughout the forecast period.

Alberta

Exhibit VI-2, following, shows the projected net manpower requirements for dental assistants. The March 1981 vacancy survey indicates that there is an immediate requirement for additional practitioners. Based on current training outputs, however, this requirement will be met by 1985, and the projected supply and requirements for manpower will be approximately balanced throughout the forecast period.

Saskatchewan

Data on the current active stock, and the number of dental assistant positions in the province is limited. Based on the current population ratio there is a requirement for approximately 10 additional practitioners per year throughout the forecast period. It is considered that the approach using the ratio of dental assistants to dentists exaggerates the requirement, and this approach has not been used to determine future training needs.

EXHIBIT VI-3

NET MANPOWER REQUIREMENTS - BY ALTERNATIVE SCENARIO

DENTAL ASSISTANTS - SASKATCHEWAN

		PROJECTED REQUIREMENTS			
YEAR	STOCK	DENTISTS AT 1:2000	DENTISTS AT 1:1800	CURRENT POPULATION DENTISTS AT	CURRENT POPULATION DENTAL ASSTS.
1981	741	1112	1171	745	741
NET		371	430	4	-
1985	762	1181	1311	791	790
NET		419	549	29	28
1990	780	1163	1402	843	844
NET		383	622	63	64
1995	788	1333	1482	893	893
NET		545	694	105	105
2000	790	1399	1554	937	937
NET		609	764	147	183

EXHIBIT VI-4

NET MANPOWER REQUIREMENTS - BY ALTERNATIVE SCENARIO

DENTAL ASSISTANTS - MANITOBA

		PROJECTED REQUIREMENTS			
YEAR	STOCK	DENTISTS AT 1:2000	DENTISTS AT 1:1800	CURRENT POPULATION DENTISTS AT	CURRENT POPULATION DENTAL ASSTS.
1981	610	769	857	612	614
NET		159	247	2	4
1985	708	788	877	628	630
NET		80	169	-80	-78
1990	769	815	906	648	643
NET		46	137	-121	-126
1995	801	836	931	665	668
NET		35	130	-136	-133
2000	820	855	951	680	683
NET		35	131	-140	-137

Manitoba

Data on the current active stock, and the number of dental assistant positions in the province is limited. Based on the current population ratio there is a surplus of approximately 7 practitioners per year throughout the forecast period.

INDICATED MANPOWER RESPONSE

Dentists

Given the projected oversupply of dentists at both the western Canada regional level and at the national level there is a need to limit the number of new dentists entering the labour market. In western Canada there is the potential for a surplus of approximately 50 dentists per year at the regional level. The major manpower problem is not supply, but geographic distribution and provincial disparities.

The potential surplus is further compounded by the age structure of dentists in western Canada. The mean age of practising dentists is 41 which indicates that typically the average dentist will stay in the active labour market for approximately 24 additional years.

Traditionally dentists have enjoyed a fair degree of mobility and it is apparent that as the potential to establish new practices declines in urban areas, dentists will seek to either set up practice in less densely populated areas or alternatively form associate relationships with established practitioners.

Historically the province of Ontario has had a significant training output and has graduated approximately 175 new dentists per annum. This contrasts with " training output of the four western provinces of 135 per annum.

If, however, Ontario cuts back on enrolments into dentistry training programs this may have a significant impact on the long term rates of migration into western Canada. This change in migration rate could most significantly affect British Columbia and Alberta.

Western Canada has three different manpower situations. There is a significant surplus of dentists in British Columbia, approximate balance of supply and requirement in Alberta, and a growing supply of practitioners in Saskatchewan and Manitoba. Given the current uncertainty of dentists supply at the national level (and the projected cutback in enrolments in Ontario), it is appropriate to maintain current training levels in Alberta, Saskatchewan and Manitoba and to plan reductions in training outputs in British Columbia.

Although the increase in the number of dentists in British Columbia and Alberta has been approximately the same in the last five years, the manpower situation in each province is significantly different. There is a projected surplus in British Columbia, which under an assumption of continued in-migration and the current level of training output, increases during the forecast period. This contrasts with Alberta, where there is a requirement for additional dentists based provincial on the rapid population growth in the forecast period.

The projected manpower requirements in the province of Saskatchewan under a service target ratio of 1:2,400 and 1:2,200 indicate the potential for a surplus by 1990. Training outputs have been projected at 16-18 for the period under review. It is assumed that 15 graduates per year is a minimum level of viability for the program. The supply and requirements for dentists should be monitored for the next three years, and a decision on the future viability of the program should be made in 1985. An option of contracting training places in the training programs in Manitoba should be reviewed.

Dental Hygienists

Approximately 98% of the active dental hygienists in western Canada are female and approximately 85% are aged 35 or less. As with all female dominated occupations the prevalence of part-time and full-time practitioners has a significant impact on supply. Typically dental hygienists work 31 hours a week and 50% work in excess of 34 hours per week.[1]

The 1981 survey[1] (Alberta Health and Social Service Manpower Monitoring System) shows that approximately 40% of the active dental hygienists work part-time. Given the high average hours worked per week, however, no attempt has been made to calculate fulltime equivalent practitioners.

There is currently sufficient training capacity at the western Canada region level. There is a potential surplus of practitioners in British Columbia, Saskatchewan and Manitoba, and a requirement for practitioners in Alberta. The surplus dental hygienists would be fully employed if the level of utilization of dental hygienists were to increase by 10%. This increase would further exaggerate the requirement in Alberta.

Dental Assistants

The generic category of dental assistants can be subdivided into those assistants trained by dentists in the office (on-the-job training) and those trained in a formal setting (either classroom or by correspondence course). Based on the limited sample of the province of Alberta, the majority of

---

[1] Lewis, D.W. - Demographic and Employment Profile of Dental Hygienists in Canada, 1979, Research Report No. 40.

Dental Assistants work full-time. The 1981 survey[2] indicated that 17% of on-the-job trained dental assistants work part-time and 7.7% of formally trained dental assistants work part-time.

With the increased sophistication of dental care and the expanding technology it is likely that office trained assistants may be replaced by assistants who have received formal training. If this trend were to continue in the future the existing level of training would be appropriate for all the western provinces, with the exception of British Columbia where there is the potential for a surplus.

DEFINED ALTERNATIVE LOCATIONS

Currently each of the four western provinces has established training programs for each of the dental occupations. Given the net manpower requirements defined in above several training alternatives were considered. Although the relative size of the programs is limited, the alternative of regional training programs for the dental occupations has been rejected. While there are certain economies of scale in terms of consolidated regional training, the advantages of provincial training out-weigh the advantages of centralized training. Each occupation is discussed below.

Dentists

There is an ongoing requirement to train approximately 90 dentists per year in western Canada. The individual manpower needs of the provinces can best be met by providing training in a localized provincial situation. In

---

1/2 Alberta Health and Social Services Manpower Monitoring System, March, 1981 survey.

addition there are several "ancilliary" benefits of provincial training. There is a tendency for graduates to be drawn from and remain in their province of origin. This has particular advantage in the provinces of Saskatchewan and Manitoba, where traditionally the non-resident has tended to move out of the province after a few years of service. In addition in a centralized regional training concept there is no "guaranteed" method to ensure that an individual will return to the province of origin after training.

It has also been suggested that provincial training programs provide a sense of "professional rivalry" and stimulate academic and professional development. There is a concern that a regional training facility would tend to result in professional standardization and would not reflect provincial operating differences.

In summary, although the concept of centralized regional training for dentists was evaluated it is considered that, at this time, provincial training programs remain the most viable alternative.

Dental Hygienists

There is an ongoing requirement to train approximately 100 dental hygienists per year in western Canada. The relative size of the programs in British Columbia, Alberta and Manitoba limit the potential for regional training. The alternative of combining the training programs in Saskatchewan and Manitoba was considered, but this alternative fails to recognize the unique characteristics of the Wascana Institute Dental Hygiene module which is specifically designed to broaden the skills and scope of the dental nurse. It was not considered appropriate to discontinue this program as the graduates are specifically skilled for the Saskatchewan dental care programs.

Although the concept of centralized regional training for dental hygienists was evaluated, it is considered that, at this time, maintaining provincial training programs is the most viable alternative.

Dental Assistants

There is an ongoing requirement to train approximately 500 dental assistants per year in western Canada. There are currently 15 training programs in the four provinces and because of the large number of graduates required in each province it is considered that centralized training is not a viable alternative.

Review of Funding Arrangements

There are no shared training programs for the dental occupations and therefore the potential for the inter-provincial sharing of operational and administrative costs is not practical.

Defined Length of Training Agreements

There are no proposed inter-provincial training agreements.

IV. RECOMMENDATIONS

Recommendations for each of the occupations in the dental group are set out below.

Dentists

- **British Columbia**

.1- That annual enrolments into the dental program at the University of British Columbia be reduced by 15 places per year to an annual intake quota of 25.

- **Alberta**

.2- That annual enrolments into the dental program at the University of Alberta be maintained at the current level for a period of five years.

.3- That the trend in migration into the province be carefully monitored, and that the effect of migration on future supply is assessed in relation to the manpower requirements determined using a ratio of 1:2,000.

- **Saskatchewan**

.4- That enrolment levels into the dental program at the University of Saskatchewan be maintained at the current level for a period of five years.

- Manitoba

.5- That enrolment levels into the dental program at the University of Manitoba be maintained at the current level for a period of five years.

Dental Hygienists

- British Columbia

.6- That the enrolment levels into the dental hygiene program at the University of British Columbia be maintained at the current level for a period of five years.

.7- That no additional training programs for dental hygiene be considered at this time.

- Alberta

.8- That existing training enrolments in dental hygiene programs be increased by 25 per year.

- Saskatchewan

.9- That enrolment levels into the dental hygiene program at the Wascana Institute be maintained at the current level.

.10- That consideration be given to expanding current enrolment levels by 5 if it is considered that the current ratio of dental hygienists to population is unacceptable.

- Manitoba

.11- That enrolment levels into the dental hygiene program at the University of Manitoba be maintained at the current level.

Dental Assistants

- British Columbia

.12- That current enrolment levels into dental assistant training programs be reduced by 10% or 20 places per year.

- Alberta

.13- That current enrolment levels into dental assistant training programs be maintained for 5 years and that a reassessment of future manpower requirements be carried out at that time.

- Saskatchewan

.14- That current enrolment levels into dental assistant training programs be increased by 10 places per year.

- Manitoba

.15- That current enrolment levels into dental assistant training programs be decreased by 8 places per year.

APPENDIX I

STUDY APPROACH AND METHODOLOGY

STUDY APPROACH

Introduction

In order to achieve the study objectives, the work program consists of three key activities. These are:

- the analysis of manpower supply and requirements, and the calculation of net manpower requirements
- the analysis of existing training programs for Western Canada
- the development of recommendations for alternative training locations and funding arrangements

Analysis of Manpower Supply and Requirements

The analysis of manpower supply and requirements is designed to allow for a variety of data inputs, and for different emphasis depending on the occupation under review. A variety of data sources are used including provincial and national associations, health insurance agencies, and provincial health and education departments. In all instances, data is developed independently of previously published sources.

In addition to the basic projection of net manpower requirements, a number of sensitivity analyses have been completed to assess the impact of changed in the factors affecting supply and requirements, prior to developing recommendations for either additional training programs, or expanding existing training programs.

Approaches to Determining Manpower Requirements

The approach developed to determine manpower requirements uses three methods of projection. These are discussed below.

1. Service Utilization Approach

The utilization approach is based on an analysis of the pattern of health service usage. It establishes trends in service utilization and projects these onto future population estimates. There are three steps in the service utilization approach.

Step 1 - Determine Per Capita Utilization Rate

Historical data of the number of services provided, by age and sex of recipient is derived. The number of services per age/sex group is then divided by the population for group in the corresponding year. This results in a per capita utilization rate.

Step 2 - Project Future Service Required

The per capita utilization rate is projected onto the low, medium and high population for each year from 1981 to 2000. This results in an estimate of total future services.

Step 3 - Estimated Number of Practitioners Required

Having determined the total future services, the model projects the number of practitioners required, by assuming a constant level of services per practitioner. The number of services per practitioner is determined by dividing total services by the number of practitioners in the base year. To estimate the required number of practitioners, the model divides total future services required by the number of services per practitioner.

2. Service Target Ratio Approach

Service target ratios reflect a theorectical optimal manpower level required to meet health service requirements in the occupation under review. They are expressed as the ratio of practitioner to population. The service target ratios are derived based on discussion with health authorities, review of published reports, articles and summary of defined health care needs.

3. Population Ratio Approach

Population ratios are derived by dividing the total population at a specific point in time by the number of active practitioners. This results in a ratio of practitioners to population.

These ratios are analysed to determine if any trends exists. to project futuren manpower requirements, the model divides total projected population by the previously determined population ratio.

Summary of Approaches to Projecting Manpower Requirements

The three approaches outlined above have been used for the calculation of manpower requirements for this occupation. The specific application of each approach to this occupation is discussed under General Assumption, Appendix II, following.

Development of Recommendations for Alternative Training Locations and Funding Arrangements

We have developed a decision process to assist in developing recommendations for alternative training location(s) and funding arrangements. This process is designed to allow for the logical, consistent evaluation of a range of training alternatives.

There are seven steps in the decision process:

- Step 1. Analysis of manpower requirements
- Step 2. Identification of the appropriate type(s) of training
- Step 3. Definition of alternative training locations
- Step 4. Evaluation of alternative locations for new programs
- Step 5. Establishment of timing of training program requirement
- Step 6. Recommendation on training action(s) and location(s)
- Step 7. Recommendation on funding alternative(s)

LABOUR MARKET SUPPLY

Labour market supply is the relationship between the estimated number of practitioners registered with the provincial associations, the number of practitioners actually employed and the number of vacant positions. Vacancy survey data (normally collected by provincial governments) will identify the total number of budgeted positions, which is the total of the number currently employed plus vacancies.

Labour market supply is a useful tool to estimate, or determine the employment situation for each occupation. The current supply situation is expressed as total budgeted positions divided by the total number of registered practitioners. This percentage (%) of qualified practitioners who are currently employed will indicate the flexability of the existing labour market.

APPENDIX II

PROVINCIAL NET MANPOWER REQUIREMENTS

II - 1 - Dentists

II - 2 - Dental Hygenists

II - 3 - Dental Assistants

II.1 DENTISTS

Table XI.0.1

Number of Practitioners by Province in Western Canada

Occupation: DENTISTS

Year	British Columbia[1]	Alberta[2]	Saskatchewan[3]	Manitoba[4]
1970	-	577	216	304
1971	-	574	221	312
1972	-	607	233	320
1973	-	659	245	340
1974	-	702	256	348
1975	-	727	278	355
1976	-	758	277	374
1977	-	810	294	387
1978	-	871	304	403
1979	-	949	315	407
1980	1605	971	323	419

Notes:

Table XI.0.2

Factors Affecting Manpower Supply in Western Canada

Occupation: DENTISTS

Factor	British Columbia	Alberta
Opening Stock	1605	971
Net Migration	40 for all years	-3 for all years
Net Immigration	10 for all years	9 for all years
Net Occupation Shift	Zero for all years	Zero for all years
Training Output	40 for all years	45 for all years
Attrition	32 for 1981-1982 33 for 1983-1985 24 for 1986-1995 35 for 1996-2000	Actual Retirement

	Saskatchewan	Manitoba
Opening Stock	323	419
Net Migration	Zero for all years	-10% of stock
Net Immigration	2% of opening stock	1 for all years
Net Occupation Shift	Zero for all years	-5 for all years
Training Output	14 for 1981-1982 16 for 1983 18 for 1984-2000	36 for 1981 28 for 1982 30 for 1983 33 for 1984 30 for 1985-2000
Attrition	Actual Retirement	Actual Retirement

GENERAL ASSUMPTIONS

Manpower Stock

Table XI.0.1 (opposite), illustrates the total number of active dentists identified in each of the provinces in Western Canada.

Factors Affecting Manpower Supply

The assumptions made with respect to each of the factors which have the potential to affect manpower stock are shown opposite in Table XI.0.2. These factors include migration, immigration, training output, active/inactive movement and retirement through attrition. For each of these assumptions, the information source has been identified. Assumptions affecting manpower have been based on historical and current information along with projected trends. The age distribution for dentists in shown in Table XI.0.3.

Estimating Requirements

- Historical Ratio

  For each province, the current ratio of dentists to population was used to project the number of practitioners required in the future to maintain the current level of manpower.

- Utilization

  The utilization approach was not used to determine net manpower requirements for dentists. Utilization data for dentists is not age specific, therefore, it does not provide an accurate utilization pattern of services related to the changing proportion of population age groups.

TABLE XI.0.3

AGE STRUCTURE OF DENTISTS

BY PROVINCE AND REGION

AGE GROUP	BRITISH COLUMBIA	ALBERTA	SASKATCHEWAN	MANITOBA	TOTAL #	TOTAL %
24 or less	-	20	-	8	28	0.8
25 - 29	211	201	40	83	535	15.8
30 - 34	336	182	54	73	645	19.0
35 - 39	337	186	51	59	633	18.8
40 - 44	178	103	35	47	363	10.7
45 - 49	177	100	22	30	329	9.7
50 - 54	121	67	29	31	248	7.3
55 - 59	119	78	31	29	257	7.6
60 - 64	97	54	25	31	207	6.1
65 or over	66	33	20	23	142	4.2
UNKNOWN	-	-	-	-	-	-
TOTAL	1642	1024	307	414	3387	100.0

- Service Target Ratio

The service target ratio of 1 dentist to 2,000 people was developed in Dental Manpower Population Ratio estimates for Canada under four situations, Health Manpower Report No. 1-73. The ratio has been accepted by the profession and health care industry as an ideal number of dentists to service the needs of a population. Within the profession there has been discussion that a range of 1:2,000 to 1:1,800 may be appropriate, depending on population density.

Sensitivity Analysis

The manpower requirements were projected for each province on the basis of 1:1,800, 1:1,900, 1:2,000. In addition, sensitivity analysis was conducted to determine the impact of reduced training output from the province of Ontario, on the rate of migration into Western Canada. Specific simulations were made to assess the impact of reduced migration into British Columbia, and increased immigration into Alberta.

II.2 DENTAL HYGENISTS

Table XI.0.4

Number of Practitioners by Province in Western Canada

Occupation: DENTAL HYGENISTS

Year	British Columbia[1]	Alberta[2]	Saskatchewan[3]	Manitoba[4]
1970	-	-	30	-
1971	-	141	29	-
1972	-	218	37	-
1973	-	204	39	-
1974	215	331	39	121
1975	263	308	44	126
1976	280	307	42	132
1977	310	419	43	144
1978	315	421	49	154
1979	353	426	50	165
1980	415	409	55	169

Notes:

Table XI.0.5

Factors Affecting Manpower Supply in Western Canada

Occupation: DENTAL HYGENISTS

Factor	British Columbia	Alberta
Opening Stock	415	409
Net Migration	25 for all years	-4 for all years
Net Immigration	9 for all years	Zero for all years
Net Occupation Shift	-5% of stock	-5% of stock
Training Output	20 for all years	32 for all years
Attrition	1 for all years	Actual Retirement

	Saskatchewan	Manitoba
Opening Stock	55	169
Net Migration	1 for all years	Zero for all years
Net Immigration	Zero for all years	1 for all years
Net Occupation Shift	-5% of stock	-5% of stock
Training Output	10 for all years	16 for all years
Attrition	Zero for all years	Zero for all years

GENERAL ASSUMPTIONS

Manpower Stock

Table XI.0.4 (opposite), illustrates the total number of active dental hygenists identified in each of the provinces in Western Canada.

Factors Affecting Manpower Supply

The assumptions made with respect to each of the factors which have the potential to affect manpower stock are shown opposite in Table XI.0.5. These factors include migration, immigration, training output, active/inactive movement and retirement through attrition. For each of these assumptions, the information source has been identified. Assumptions affecting manpower have been based on historical and current information along with projected trends. The age distribution for dental hygenists in shown in Table XI.0.6.

Estimating Requirements

- Historical Ratio

  For each province, the current ratio of dental hygenists to population was used to project the number of practitioners required in the future to maintain to current level of manpower.

- Utilization

  The utilization approach was not used to determine net manpower requirements for dental hygenists. Utilization data for dental hygenists is not age specific, therefore, it does not provide an accurate utilization pattern of services related to the changing proportion of population age groups.

TABLE XI.0.6

AGE STRUCTURE OF DENTAL HYGIENISTS

BY PROVINCE AND REGION

AGE GROUP	BRITISH COLUMBIA	ALBERTA	SASKATCHEWAN	MANITOBA	TOTAL	
					#	%
24 or less	119	176	8	57	360	31.7
25 - 29	120	144	21	75	360	31.7
30 - 34	91	73	14	43	221	19.4
35 - 39	91	44	3	16	154	13.5
40 - 44	8	3	2	4	17	1.5
45 - 49	7	5	1	1	14	1.2
50 - 54	3	3	-	-	6	0.5
55 - 59	3	-	-	2	5	0.5
60 - 64	-	-	-	-	-	-
65 or over	-	-	-	1	1	-
UNKNOWN	-	-	-	-	-	-
TOTAL	442	448	49	199	1138	100.0

- Service Target Ratio

  There is no service target ratio for dental hygenists.

- Ratio of Dental Hygenists to Dentists

  The current ratio of dental hygenists to dentists was used to project the future requirements for practitioners. This ratio was then extrapolated onto the projected manpower requirements for dentists to determine the future requirements for dental hygenists.

Sensitivity Analysis

In addition to the extrapolation of the current ratio of dental hygenists to dentists at differing service target ratios, an assessment was made of the impact of an increased demand for dental hygenists. Various scenarios were evaluated including increase demand of 10%, 15%, 20% and 25%.

II-3 DENTAL ASSISTANTS

Table XI.0.7

Number of Practitioners by Province in Western Canada

Occupation: DENTAL ASSISTANTS

Year	British[1] Columbia	Alberta[2]	Saskatchewan[3]	Manitoba[4]
1971	-	-	23	-
1972	-	-	89	-
1973	-	-	128	-
1974	-	-	188	-
1975	-	-	220	-
1976	-	449	355	-
1977	-	560	457	-
1978	-	636	562	-
1979	-	753	651	-
1980	1403	836	736	610

Notes:

Table XI.0.8

Factors Affecting Manpower Supply in Western Canada

Occupation: DENTAL ASSISTANTS

Factor	British Columbia	Alberta
Opening Stock	1403	836
Net Migration	45 for all years	32 for all years
Net Immigration	Zero for all years	Zero for all years
Net Occupation Shift	-10% of stock	-10% of stock
Training Output	202 for all years	98 for all years
Attrition	2 for 1981-1986 3 for 1987-1990 5 for 1991-1996 6 for 1997-2000	Zero for all years

	Saskatchewan	Manitoba
Opening Stock	736	610
Net Migration	1 for all years	1 for all years
Net Immigration	Zero for all years	Zero for all years
Net Occupation Shift	-10% of stock	-10% of stock
Training Output	80 for all years	56 for all years
Attrition	Actual Retirement	Actual Retirement

GENERAL ASSUMPTIONS

Manpower Stock

Table XI.0.7 (opposite), illustrate the total number of active dental assistants identified in each of the provinces in Western Canada.

Factors Affecting Manpower Supply

The assumptions made with respect to each of the factors which have the potential to affect manpower stock are shown opposite in Table XI.0.8. These factors include migration, immigration, training output, active/inactive movement and retirement through attrition. For each of these assumptions, the information source has been identified. Assumptions affecting manpower have been based on historical and current information along with projected trends. The age distribution for dental assistants is shown in Table XI.0.9.

Estimating Requirements

- Historical Ratio

  For each province, the current ratio of dental assistants to population was used to project the number of practitioners required in the future to maintain to current level of manpower.

- Utilization

  The utilization approach was not used to determine net manpower requirements for dental assistants. Utilization data for dental assistants is not age specific, therefore, it does not provide an accurate utilization pattern of services related to the the changing proportion of populatioin age groups.

TABLE XI.0.9

AGE STRUCTURE OF DENTAL ASSISTANTS

BY PROVINCE AND REGION

AGE GROUP	BRITISH COLUMBIA	ALBERTA	SASKATCHEWAN	MANITOBA	TOTAL #	TOTAL %
24 or less	701	378	336	275	1690	
25 - 29	579	316	281	230	1406	
30 - 34	184	85	75	62	406	
35 - 39	185	20	18	15	238	
40 - 44	31	12	11	9	73	
45 - 49	31	9	9	7	56	
50 - 54	12	9	8	7	36	
55 - 59	12	1	1	1	15	
60 - 64	4	4	4	3	15	
65 or over	-	2	2	1	5	
UNKNOWN	-	-	-	-	-	
TOTAL	1739	836	745	610	3942	

- Service Target Ratio

  There is no service target ratioin for dental hygenists.

- Sensitivity Analysis

  In the absence of a clear pattern of service utilization no sensitivity analysis was undertaken for this occupation.

II.1 DENTISTS

Table XI.1.1

Province: BRITISH COLUMBIA
Occupation: DENTISTS

Year	Number of Practitioners	Population to Manpower
1980	1605	1: 1630

Source:

Table XI.1.2

Factors Affecting Manpower Supply

Province: BRITISH COLUMBIA
Occupation: DENTISTS

Factor	Assumption	Source
Opening Stock	1605	H.M.R.U.[2]
Net Migration	40 for all years	B.C.C.D.S.[3]
Net Immigration	10 for all years	B.C.C.D.S.
Net Occupational Shift[1]	Zero for all years	B.C.C.D.S.
Training Output	40 for all years	B.C.C.D.S.
Attrition	32 for 1981-1982 33 for 1983-1985 24 for 1986-1995 35 for 1996-2000	H.M.R.U.

Notes:

[1] Includes Active/Inactive Flows

[2] H.M.R.U. IS HEALTH MANPOWER RESEARCH UNIT

[3] B.C.C.D.S. IS BRITISH COLUMBIA COLLEGE OF DENTAL SURGEONS

PROVINCIAL ASSUMPTIONS

BRITISH COLUMBIA

a) Legal Controls

The Dentists Act (R.S. Chap. 92-1979), is the act regulating the practice of dentistry in the province of British Columbia.

The certification and licensing requirements are shown in Appendix III - 1 -Scope and Control of Practice.

b) Assumptions

Table XI.1.1 (opposite), indicates the total number of dentists in British Columbia identified as active.

o Factors Affecting Manpower Supply

The assumptions made with respect to each of the factors which have the potential to affect manpower supply are shown in Table XI.1.2 (opposite). These factors include migration, immigration, active to inactive movements, training output and retirement. For each assumption, the information source has been identified. The age distribution for active dentists is shown in Table XI.1.3.

o Confidence in Factors Affecting Manpower Supply

The assumptions made on manpower supply for dentists were developed from information published in Report R:16, through the Health Manpower Research Unit (HMRU) and from estimates made by the British Columbia College of Dental Surgeons.

TABLE XI.1.3

TOTAL NUMBER OF ACTIVE DENTISTS

IN BRITISH COLUMBIA BY AGE

AGE GROUP	MALE	FEMALE	TOTAL
20 - 24	-	-	-
25 - 29	173	38	211
30 - 34	316	20	336
35 - 39	317	20	337
40 - 44	171	7	178
45 - 49	170	7	177
50 - 54	118	3	121
55 - 59	117	2	119
60 - 64	96	1	97
65 or over	66	-	66
UNKNOWN	-	-	-
TOTAL	1544	98	1642

Source: Health Manpower Research Unit

TABLE XI.1.4

DENTISTS - BRITISH COLUMBIA

NET MANPOWER REQUIREMENTS: BY PROVINCE
BY ALTERNATIVE SCENARIO

	SERVICE TARGET Population Ratio			
SUPPLY	1:1634	1:2000	1:1900	1:1800
1981 - 1663	1636	1337	1407	1485
Net	(27)	(326)	(256)	(178)
1982 - 1721	1670	1365	1436	1516
Net	(51)	(356)	(285)	(205)
1983 - 1778	1704	1392	1465	1547
Net	(74)	(386)	(313)	(231)
1984 - 1835	1738	1420	1495	1578
Net	(97)	(415)	(340)	(257)
1985 - 1892	1772	1448	1524	1609
Net	(120)	(444)	(368)	(283)
1990 - 2222	1939	1584	1668	1760
Net	(283)	(638)	(554)	(462)
1995 - 2552	2089	1707	1797	1897
Net	(463)	(845)	(755)	(655)
2000 - 2827	2221	1815	1910	2017
Net	(606)	(1012)	(917)	(810)

There is mandatory licensing requirements for dentists in the province of British Columbia, and the information on active stock, movements from migration, immigration and movement from active to inactive are considered to be accurate. Specific age distribution information was obtained from HMRU, and retirement was assumed at age 65.

o Estimating Requirements

. Historical Ratio

The current British Columbia ratio of 1 dentist to 1,634 population, was used to project the number of dentists required in the future to maintain the current level of manpower.

. Service Target Ratio

The service target ratio of 1 dentist to 2,000 population, was used to determine a reasonable requirement level of dentists to attain by the year 2000.

o Net Manpower Requirements

The net manpower requirements under each projection approach are shown in Table XI.1.4 (opposite). The most likely scenario is based on a service target ratio of 1:2,000 under the medium population projection.

II.2 DENTAL HYGENISTS

Table XI.1.4

Province: BRITISH COLUMBIA
Occupation: DENTAL HYGENISTS

Year	Number of Practitioners	Population to Manpower
1974	215	1: 11140
1975	263	1: 9340
1976	280	1: 8740
1977	310	1: 8040
1978	315	1: 8030
1979	353	1: 7300
1980	415	1: 6320

Source:

Table XI.1.5

Factors Affecting Manpower Supply

Province: BRITISH COLUMBIA
Occupation: DENTAL HYGENISTS

Factor	Assumption	Source
Opening Stock	415	H.M.R.U.[2]
Net Migration	25 for all years	ESTIMATES[3]
Net Immigration	9 for all years	ESTIMATES
Net Occupational Shift[1]	-5% of stock	ESTIMATES
Training Output	20 for all years	H.M.R.U.
Attrition	1 for all years	H.M.R.U.

Notes:

[1] Includes Active/Inactive Flows

[2] H.M.R.U. IS HEALTH MANPOWER RESEARCH UNIT

[3] ESTIMATES OBTAINED FROM REPORT ON DEMOGRAPHICS AND EMPLOYMENT PROFILE OF DENTAL HYGENISTS IN CANADA 1979, RESEARCH REPORT NO. 40, FACULTY OF DENTISTRY, UNIVERSITY OF TORONTO

PROVINCIAL ASSUMPTIONS

BRITISH COLUMBIA

a) Legal Controls

b) Assumptions

Table XI.1.4 (opposite), indicates the total number of dental hygenists in British Columbia identified as active.

o Factors Affecting Manpower Supply

The assumptions made with respect to each of the factors which have the potential to affect manpower supply are shown in Table XI.1.5 (opposite). These factors include migration, immigration, active to inactive movements, training output and retirement. For each assumption, the information source has been identified. The age distribution for active dental hygenists is shown in Table XI.1.6.

o Confidence in Factors Affecting Manpower Supply

The assumptions made on manpower supply for dental hygenists were developed from information published in Report R:16, through the Health Manpower Research Unit (HMRU) and from estimates made by the association.

In order to practice as a dental hygenist in the province of British Columbia, it is necessary to be registered by the College of Dental Surgeons, and to hold a valid license. The College of Dental Surgeons regularly updates the dental hygenist file at UMRU. Estimates of manpower movements fro migration, immigration and movement from active to inactive were obtained from the association, and from the report Demographic and Employment Profile of Dental Hygenists in Canada 1979,

TABLE XI.1.6

TOTAL NUMBER OF ACTIVE DENTAL HYGIENISTS

IN BRITISH COLUMBIA BY AGE

AGE GROUP	MALE	FEMALE	TOTAL
20 - 24	1	118	119
25 - 29	2	118	120
30 - 34	3	88	91
35 - 39	2	89	91
40 - 44	2	6	8
45 - 49	2	5	7
50 - 54	1	2	3
55 - 59	1	2	3
60 - 64	-	-	-
65 or over	-	-	-
UNKNOWN	-	-	-
TOTAL	14	428	442

Source: Health Manpower Research Unit

TABLE XI.1.7

DENTAL HYGIENISTS - BRITISH COLUMBIA

NET MANPOWER REQUIREMENTS WESTERN CANADA REGION BY ALTERNATIVE SCENARIO

YEAR	STOCK	DENTISTS AT 1:2000	DENTISTS AT 1:1800	CURRENT POPULATION
1981	424	346	385	423
Net		-78	-39	1
1985	530	375	417	458
Net		-155	-113	-72
1990	633	410	456	501
Net		-223	-177	-132
1995	712	442	491	540
Net		-270	-221	-172
2000	773	470	522	574
Net		-303	-251	-199

Research Report No. 40, Dental Health, Care Services Research Unit, Faculty of Dentistry, University of Toronto. The active to inactive movement was based on an assumption of a -5% of active stock. The age distribution was obtained from UMRU and retirement was assumed at age 60.

o Estimating Requirements

- Historical Ratio

  The current British Columbia ratio of 1 dental hygenist to 6,321 population, was used to project the number of dental hygenists required in the future to maintain the current level of manpower.

- Ratio of Dental Hygenists to Dentists

  The current ratio of 1 dental hygenist to 386 dentists was used to project future manpower requirements.

o Net Manpower Requirements

The net manpower requirements under each projection approach are shown in Table XI.1.7 (opposite). The most likely scenario is based on the current ratio of hygenists to dentists with dentists calculated at current population ratio under the medium population projection.

II-3 DENTAL ASSISTANTS

Table XI.1.8

Province: BRITISH COLUMBIA
Occupation: DENTAL ASSISTANTS

Year	Number of Practitioners	Population to Manpower
1980	1403	1: 1870

Source:

Table XI.1.9

Factors Affecting Manpower Supply

Province: BRITISH COLUMBIA
Occupation: DENTAL ASSISTANTS

Factor	Assumption	Source
Opening Stock	1403	H.M.R.U.[2]
Net Migration	45 for all years	ESTIMATES[3]
Net Immigration	Zero for all years	ESTIMATES
Net Occupational Shift[1]	-10% of stock	ESTIMATES[4]
Training Output	202 for all years	H.M.R.U.
Attrition	2 for 1981-1986 3 for 1987-1990 5 for 1991-1996 6 for 1997-2000	H.M.R.U.

Notes:

[1] Includes Active/Inactive Flows

[2] H.M.R.U. IS HEALTH MANPOWER RESEARCH UNIT

[3] ESTIMATES BASED ON PATTERN OF MANPOWER MOVEMENTS FROM PROVINCE OF ALBERTA

[4] ESTIMATES OBTAINED FROM PROVINCIAL ASSOCIATIONS IN ALL PROVINCES

PROVINCIAL ASSUMPTIONS

BRITISH COLUMBIA

a) Legal Controls

b) Assumptions

Table XI.1.8 (opposite), indicates the total number of dental assistants in British Columbia identified as active.

o Factors Affecting Manpower Supply

The assumptions made with respect to each of the factors which have the potential to affect manpower stock are shown opposite in Table XI.1.9. These factors include migration, immigration, training output and retirement. For each of these assumptions, the information source has been identified. The age distribution for active dental assistants is shown in Table XI.1.10.

o Confindence in Factors Affecting Manpower Stock

The assumptions made on manpower stock for dental assistants were developed on information published in Report S3, through the Health Manpower Research Unit (HMRU).

In order to practice as a certified dental assistant in British Columbia it is necessary to be registered by the college of Dental Surgeons, and to hold a valid licence. Information on movements from migration, immigration and movement from active to inactive was based on estimates derived from the pattern and movements in Alberta. Specific age distribution information was obtained from H.M.R.U. and retirement was assumed at age 60.

TABLE XI.1.10

TOTAL NUMBER OF ACTIVE DENTAL ASSISTANTS

IN BRITISH COLUMBIA BY AGE

AGE GROUP	MALE	FEMALE	TOTAL
20 - 24	1	700	701
25 - 29	1	578	579
30 - 34	1	183	184
35 - 39	1	184	185
40 - 44	-	31	31
45 - 49	-	31	31
50 - 54	-	12	12
55 - 59	-	12	12
60 - 64	-	4	4
65 or over	-	-	-
UNKNOWN	-	-	-
TOTAL	4	1735	1739

TABLE XI.1.11

NET MANPOWER REQUIREMENTS - BY ALTERNATIVE SCENARIO

DENTAL ASSISTANTS - BRITISH COLUMBIA

		PROJECTED REQUIREMENTS			
YEAR	STOCK	DENTISTS AT 1:2000	DENTISTS AT 1:1800	CURRENT POPULATION	
1981	1508	1172	1302	1435	1430
NET		-336	-206	-73	-78
1985	1765	1270	1411	1554	1549
NET		-495	-354	-211	-216
1990	2004	1389	1463	1700	1695
NET		-615	-514	-304	-309
1995	2202	1497	1664	1832	1851
NET		-705	-538	-370	-351
2000	2303	1592	1769	1948	1942
NET		-711	-534	-355	-361

The active to inactive movements was based on an assumption of -10% of active stock.

o Estimating Requirements

. Historical Ratio

For each province, the current ratio of 1 dental assistantto 1,898 population was used to project the number of practitioners required in the future to maintain to current level of manpower.

o Net Manpower Requirement

The net manpower requirements under each projection approach are shown in Table XI.1.11 (opposite). The most likely scenario is based on the current population ration under the medium population projection.

II.1 DENTISTS

Table XI.2.1

Province: ALBERTA
Occupation: DENTISTS

Year	Number of Practitioners	Population to Manpower
1970	577	1: 2770
1971	574	1: 2840
1972	607	1: 2720
1973	659	1: 2550
1974	702	1: 2440
1975	727	1: 2430
1976	758	1: 2430
1977	810	1: 2340
1978	871	1: 2240
1979	949	1: 2130
1980	971	1: 2140

Source:

Table XI.2.2

Factors Affecting Manpower Supply

Province: ALBERTA
Occupation: DENTISTS

Factor	Assumption	Source
Opening Stock	971	A.D.A.[2]
Net Migration	-3 for all years	A.D.A.
Net Immigration	9 for all years	A.D.A.
Net Occupational Shift[1]	Zero for all years	A.D.A.
Training Output	45 for all years	A.D.A.
Attrition	Actual Retirement	A.D.A.

Notes:

[1] Includes Active/Inactive Flows

[2] A.D.A. IS ALBERTA DENTAL ASSOCIATION

PROVINCIAL ASSUMPTIONS

ALBERTA

a) Legal Controls

The Dental Association Act (Chapter 90 Revised Statutes Alberta 1970; Amendments May 1980), is the act regulating the practice of dentistry in the province of Alberta.

The certification and licensing requirements are shown in Appendix III - 1 -Scope and Control of Practice.

b) Assumptions

Table XI.2.1 (opposite), indicates the total number of dentists in Alberta identified as active.

o Factors Affecting Manpower Supply

The assumptions made with respect to each of the factors which have the potential to affect manpower supply are shown in Table XI.2.2 (opposite). These factors include migration, immigration, active to inactive movements, training output and retirement. For each assumption, the information source has been identified. The age distribution for active dentists is shown in Table XI.2.3.

o Confidence in Factors Affecting Manpower Supply

The assumptions made on manpower supply for dentists were developed from information made available by the Alberta Dental Association.

TABLE XI.2.3

TOTAL NUMBER OF ACTIVE DENTISTS

IN ALBERTA BY AGE

AGE GROUP	MALE	FEMALE	TOTAL
20 - 24	17	3	20
25 - 29	184	17	201
30 - 34	171	11	182
35 - 39	179	7	186
40 - 44	100	3	103
45 - 49	98	2	100
50 - 54	67	0	67
55 - 59	77	1	78
60 - 64	52	2	54
65 or over	32	1	33
UNKNOWN	-	-	-
TOTAL	997	47	1024

Source: Alberta Dental Association

TABLE XI.2.4

DENTISTS - ALBERTA

NET MANPOWER REQUIREMENTS: BY PROVINCE

BY ALTERNATIVE SCENARIO

	SERVICE TARGET Population Ratio			
SUPPLY	1:2144	1:2000	1:1900	1:1800
1981 - 1003	1005	1077	1134	1197
Net	2	74	131	194
1982 - 1025	1044	1118	1178	1243
Net	19	93	153	218
1983 - 1059	1085	1163	1224	1292
Net	26	104	165	233
1984 - 1092	1123	1204	1268	1338
Net	31	112	176	246
1985 - 1125	1157	1241	1306	1379
Net	32	116	181	254
1990 - 1277	1319	1413	1488	1571
Net	42	136	211	294
1995 - 1449	1474	1580	1663	1756
Net	25	131	214	307
2000 - 1578	1625	1742	1834	1936
Net	47	164	256	358

There is a mandatory licensing requirement for dentists in the province of Alberta, and the information on active stock, movements from migration, immigration and movement from active to inactive are considered to be accurate. Specific age distribution information was obtained from the association, and retirement was assumed at age 65.

o Estimating Requirements

. Historical Ratio

The current Alberta ratio of 1 dentist to 2,144 population, was used to project the number of dentists required in the future to maintain the current level of manpower.

. Service Target Ratio

The service target ratio of 1 dentist to 2,000 population, was used to determine a reasonable requirement level of dentists to attain by the year 2000.

o Net Manpower Requirement

The net manpower requirements under each projection approach are shown in Table XI.2.4 (opposite). The most likely scenario is based on a service target ratio of 1:2,000 under the medium population projection.

II.2 DENTAL HYGENISTS

Table XI.2.4

Province: ALBERTA
Occupation: DENTAL HYGENISTS

Year	Number of Practitioners	Population to Manpower
1971	141	1: 11540
1972	218	1: 7590
1973	204	1: 8250
1974	331	1: 5180
1975	308	1: 5740
1976	307	1: 5990
1977	419	1: 4530
1978	421	1: 4640
1979	426	1: 4740
1980	409	1: 5090

Source:

Table XI.2.5

Factors Affecting Manpower Supply

Province: ALBERTA
Occupation: DENTAL HYGENISTS

Factor	Assumption	Source
Opening Stock	409	A.D.H.A.[2]
Net Migration	-4 for all years	A.D.H.A.
Net Immigration	Zero for all years	A.D.H.A.
Net Occupational Shift[1]	-5% of stock	ESTIMATES[3]
Training Output	32 for all years	A.D.H.A.
Attrition	Actual Retirement	A.D.H.A.

Notes:

[1] Includes Active/Inactive Flows

[2] A.D.H.A. IS ALBERTA DENTAL HYGENISTS ASSOCIATION

[3] ESTIMATES OBTAINED FROM PROVINCIAL ASSOCIATIONS IN ALL PROVINCES

PROVINCIAL ASSUMPTIONS

ALBERTA

a) Legal Controls

b) Assumptions

Table XI.2.4 (opposite), indicates the total number of dental hygenists in Alberta identified as active.

o Factors Affecting Manpower Supply

The assumptions made with respect to each of the factors which have the potential to affect manpower supply are shown in Table XI.2.5 (opposite). These factors include migration, immigration, active to inactive movements, training output and retirement. For each assumption, the information source has been identified. The age distribution for active dental hygenists is shown in Table XI.2.6.

o Confidence in Factors Affecting Manpower Supply

The assumptions made on manpower supply for dental hygenists were developed from information made available from the Alberta Dental Hygenists Association.

Membership in the Association is not mandatory for hygenists, and there is no mandatory registration or licensing required under the Dental Association Act. The information on active stock was derived from Association data for both members and non-members and was verified with the March 31, 1981 survey of the Alberta Health and Social Services Manpower monitoring system. Information on migration, immigration and movement from active to inactive are considered to be accurate. The active to inactive estimates are based on a movement of -5% of active stock. The age distribution for both members and non-members was obtained from the Association, and retirement was assumed at age 60.

TABLE XI.2.6

TOTAL NUMBER OF ACTIVE DENTAL HYGIENISTS

IN ALBERTA BY AGE

AGE GROUP	MALE	FEMALE	TOTAL
20 - 24	-	-	176
25 - 29	-	-	144
30 - 34	-	-	73
35 - 39	-	-	44
40 - 44	-	-	3
45 - 49	-	-	5
50 - 54	-	-	3
55 - 59	-	-	-
60 - 64	-	-	-
65 or over	-	-	-
UNKNOWN	-	-	-
TOTAL	-	-	448

Source: Alberta Dental Hygenists Association

TABLE XI.2.7

DENTAL HYGIENISTS - ALBERTA

NET MANPOWER REQUIREMENTS WESTERN CANADA REGION BY ALTERNATIVE SCENARIO

YEAR	STOCK	DENTISTS AT 1:2000	DENTISTS AT 1:1800	CURRENT POPULATION
1981	418	454	505	423
Net		56	88	6
1985	443	523	589	487
Net		80	146	44
1990	470	595	663	555
Net		125	193	85
1995	490	665	741	621
Net		175	251	131
2000	502	734	817	685
Net		232	315	183

o Estimating Requirements

- Historical Ratio

  The current Alberta ratio of 1 dental hygenist to 5,091 population, was used to project the number of dental hygenists required in the future to maintain the current level of manpower.

- Ratio of Dental Hygenists to Dentists

  The current ratio of 1 dental hygenist to 237 dentists was used to project future manpower requirements.

o Net Manpower Requirement

The net manpower requirements under each projection approach are shown in Table XI.2.7 (opposite). The most likely scenario is based on the current ratio of dental hygenists to dentists, with dentists calculated at a service target ratio of 1:2,000, under the medium population scenario.

II-3 DENTAL ASSISTANTS

Table XI.2.8

Province: ALBERTA
Occupation: DENTAL ASSISTANTS

Year	Number of Practitioners	Population to Manpower
1976	449	1: 4090
1977	560	1: 3390
1978	636	1: 3070
1979	753	1: 2680
1980	836	1: 2490

Source:

Table XI.2.9

Factors Affecting Manpower Supply

Province: ALBERTA
Occupation: DENTAL ASSISTANTS

Factor	Assumption	Source
Opening Stock	836	A.D.A.A.[2]
Net Migration	32 for all years	A.D.A.A.
Net Immigration	Zero for all years	A.D.A.A.
Net Occupational Shift[1]	-10% of stock	Estimates[3]
Training Output	140 for all years	A.D.A.A.
Attrition	Zero for all years	Estimates[4]

Notes:

[1] Includes Active/Inactive Flows

[2] A.D.A.A. is Alberta Dental Assistants Association

[3] Estimates obtained from provincial associations for all provinces

[4] Estimates based on age distribution for province of Saskatchewan

PROVINCIAL ASSUMPTIONS

ALBERTA

a) Legal Controls

b) Assumptions

Table XI.2.8 (opposite), indicates the total number of dental assistants in Alberta identified as active.

o Factors Affecting Manpower Supply

The assumptions made with respect to each of the factors which have the potential to affect manpower stock are shown opposite in Table XI.2.9. These factors include migration, immigration, training output and retirement. For each assumption, the information source has been identified. The age distribution for active dental assistants is shown in table XI.2.10.

o Confidence in Factors Affecting Manpower Stock

The assumptions made on manpower stock for dental assistants were developed on information made available by the Alberta Dental Assistants Association.

There is no legislation in Alberta requiring mandatory registration of individuals practising as dental assistants. The membership data derived from the association is known to be understated, in that not all members of the profession have joined the association. Information on movements from migration, immigration and movement from active to inactive was based on estimates from the Association. The age distribution was based on the age distribution for dental assistants in Saskatchewan and retirement was assumed at age 60.

TABLE XI.2.10

TOTAL NUMBER OF ACTIVE DENTAL ASSISTANTS

IN ALBERTA BY AGE

AGE GROUP	MALE	FEMALE	TOTAL
20 - 24	-	378	378
25 - 29	-	315	315
30 - 34	-	85	85
35 - 39	-	20	20
40 - 44	-	12	12
45 - 49	-	9	9
50 - 54	-	9	9
55 - 59	-	1	1
60 - 64	-	4	4
65 or over	-	2	2
UNKNOWN	-	-	-
TOTAL	-	836	836

TABLE XI.2.11

NET MANPOWER REQUIREMENTS - BY ALTERNATIVE SCENARIO

DENTAL ASSISTANTS - ALBERTA[1]

YEAR	STOCK	PROJECTED REQUIREMENTS						
		DENTISTS[1] 1:2000 AT		DENTISTS[1] 1:1800 AT		CURRENT POPULATION[2]		
						DENTISTS AT	DENTAL ASSTS.	
		1:1.16	1:0.86	1:1.16	1:0.86		1:2233	1:2490
1981	836	1035	928	1150	1032	966	964	865
NET		199	92	314	196	130	128	29
1985	1141	1193	107ᵤ	1326	1190	1112	1110	996
NET		52	71	185	49	-29	-31	-145
1990	1378	1359	1218	1510	1354	1268	1265	1135
NET		-19	-160	132	-24	-110	-113	-243
1995	1518	1519	1270	1688	1362	1417	1414	1269
NET		1	-248	170	-156	-101	-104	-249
2000	1600	1675	1400	1861	1501	1562	1560	1399
NET		75	-200	261	-99	-38	-40	-201

1 Ratio of 1;1.16 is based on a theoretical number of 932 dental assistants, based on March 1981 vacancy survey data. Alberta Health and Social Service Manpower Monitoring System, March 31, 1981. Manpower requirements for Dental Assistants have been calculated at 1 dental assistant per 1.16 dentist, and 1 dental assistant per 0.86 dentists based on 1980 dental assistant association estimates.

2 Current population ratio of 1:2490 is based on Association stock of 836. Current population ratio of 1:2233 is based on Vacancy survey stock of 932.

The active to inactive movement was based on an assumption of ~10% of active stock.

- Estimating Requirements

  - Historical Ratio

    The current Alberta ratio of 1 dental assistant to 2490 population was used to project the number of dental assistants required in the future to maintain to current level of manpower.

- Net Manpower Requirement

The net manpower requirements under each projection approach are shown in Table XI.2.11 (opposite). The most likely scenario is based on the current population ratio under the medium population projection.

II.1 DENTISTS

Table XI.3.1

Province: SASKATCHEWAN
Occupation: DENTISTS

Year	Number of Practitioners	Population to Manpower
1970	216	1: 4360
1971	221	1: 4190
1972	233	1: 3930
1973	245	1: 3710
1974	256	1: 3540
1975	278	1: 3300
1976	277	1: 3330
1977	294	1: 3190
1978	304	1: 3120
1979	315	1: 3030
1980	323	1: 2990

Source:

Table XI.3.2

Factors Affecting Manpower Supply

Province: SASKATCHEWAN
Occupation: DENTISTS

Factor	Assumption	Source
Opening Stock	323	C.D.S.S.[2]
Net Migration	Zero for all years	C.D.S.S.
Net Immigration	2% of opening stock	C.D.S.S.
Net Occupational Shift[1]	Zero for all years	C.D.S.S.
Training Output	14 for 1981-1982 16 for 1983 18 for 1984-2000	C.D.S.S.
Attrition	Actual Retirement	C.D.S.S.

Notes:

[1] Includes Active/Inactive Flows

[2] College of Dental Surgeons of Saskatchewan

PROVINCIAL ASSUMPTIONS

SASKATCHEWAN

a) Legal Controls

The Dental Profession Act 1978 (R.S.S. 1978 Chapter D-5.1 and Saskatchewan Regulation 278/79), is the act regulating the right to practice dentistry in the province of Saskatchewan.

The certification and licensing requirements are shown in Appendix III - 1 -Scope and Control of Practice.

b) Assumptions

Table XI.3.1 (opposite), indicates the total number of dentists in Saskatchewan identified as active.

o Factors Affecting Manpower Supply

The assumptions made with respect to each of the factors which have the potential to affect manpower supply are shown in Table XI.3.2 (opposite). These factors include migration, immigration, active to inactive movements, training output and retirement. For each assumption, the information source has been identified. The age distribution for active dentists is shown in Table XI.3.3.

o Confidence in Factors Affecting Manpower Supply

The assumptions made on manpower supply for dentists were developed from information made available from the College of Dental Surgeons of Saskatchewan.

TABLE XI.3.3

TOTAL NUMBER OF ACTIVE DENTISTS

IN SASKATCHEWAN BY AGE

AGE GROUP	MALE	FEMALE	TOTAL
20 - 24	-	-	-
25 - 29	36	4	40
30 - 34	49	5	54
35 - 39	48	3	51
40 - 44	31	4	35
45 - 49	21	1	22
50 - 54	28	1	29
55 - 59	29	2	31
60 - 64	24	1	25
65 or over	20	-	20
UNKNOWN	-	-	-
TOTAL	286	21	307

Source: College of Dental Surgeons of Saskatchewan

TABLE XI.3.4

DENTISTS - SASKATCHEWAN

NET MANPOWER REQUIREMENTS: BY PROVINCE
BY ALTERNATIVE SCENARIO

	SERVICE TARGET Population Ratio			
SUPPLY	1:2987	1:2000	1:1900	1:1800
1981 - 335	327	488	514	543
Net	(8)	153	179	208
1982 - 346	332	495	521	551
Net	(14)	149	175	205
1983 - 358	337	503	529	559
Net	(21)	145	171	201
1984 - 376	343	510	537	567
Net	(34)	134	161	191
1985 - 398	347	518	545	575
Net	(51)	120	147	177
1990 - 504	370	553	582	615
Net	(134)	49	78	111
1995 - 615	392	585	616	650
Net	(223)	(30)	(1)	35
2000 - 752	411	614	646	682
Net	(341)	(138)	(106)	(70)

There is mandatory licensing requirement for dentists in the province of Saskatchewan, and the information on actice stock, movements from migration, immigration and movement from active to inactive are considered to be accurate. Specific age distribution information was obtained from the College and retirement was assumed at age 65.

o Estimating Requirements

. Historical Ratio

The current Saskatchewan ratio of 1 dentist to 2,987 population, was used to project the number of dentists required in the future to maintain the current level of manpower.

. Service Target Ratio

The service target ratio of 1 dentist to 2,000 population was used to determine a reasonable requirement level of dentists to attain by the year 2000.

o Net Manpower Requirements

The net manpower requirements under each projection approach are shown in Table XI.3.4 (opposite). The most likely scenario is based on a service target ratio of 1:2,000 under the medium population projection.

II.2 DENTAL HYGENISTS

Table XI.3.4

Province: SASKATCHEWAN
Occupation: DENTAL HYGENISTS

Year	Number of Practitioners	Population to Manpower
1970	30	1: 31400
1971	29	1: 31940
1972	37	1: 24760
1973	39	1: 23280
1974	39	1: 23250
1975	44	1: 20860
1976	42	1: 21940
1977	43	1: 21800
1978	49	1: 19340
1979	50	1: 19120
1980	55	1: 17540

Source:

Table XI.3.5

Factors Affecting Manpower Supply

Province: SASKATCHEWAN
Occupation: DENTAL HYGENISTS

Factor	Assumption	Source
Opening Stock	55	S.D.H.A.[2]
Net Migration	1 for all years	S.D.H.A.
Net Immigration	Zero for all years	S.D.H.A.
Net Occupational Shift[1]	-5% of stock	ESTIMATES[3]
Training Output	10 for all years	S.D.H.A.
Attrition	Zero for all years	S.D.H.A.

Notes:

[1] Includes Active/Inactive Flows

[2] S.D.H.A. IS SASKATCHEWAN DENTAL HYGENISTS ASSOCIATION

[3] ESTIMATES OBTAINED FROM PROVINCIAL ASSOCIATIONS IN ALL PROVINCES

PROVINCIAL ASSUMPTIONS

SASKATCHEWAN

a) Legal Controls

b) Assumptions

Table XI.3.4 (opposite), indicates the total number of dental hygenists in Saskatchewan identified as active.

o Factors Affecting Manpower Supply

The assumptions made with respect to each of the factors which have the potential to affect manpower supply are shown in Table XI.3.5 (opposite). These factors include migration, immigration, active to inactive movements, training output and retirement. For each assumption, the information source has been identified. The age distribution for active dental hygenists is shown in Table XI.3.6.

o Confidence in Factors Affecting Manpower Supply

The assumptions made on manpower supply for dental hygenists were developed from information made available from the Saskatchewan Dental Hygenists Association.

Under the Dental Professions Act all dental hygenists in the province must be registered with the College of Dental Surgeons of Saskatchewan. Estimates of manpower movements from migration, immigration and movement from active to inactive were obtained from the Association. The active to inactive movement was based on an assumption of -5% of active stock. The age distribution was obtained from the Association and retirement was assumed at age 60.

TABLE XI.3.6

TOTAL NUMBER OF ACTIVE DENTAL HYGIENISTS

IN SASKATCHEWAN BY AGE

AGE GROUP	MALE	FEMALE	TOTAL
20 - 24	-	-	8
25 - 29	-	-	21
30 - 34	-	-	14
35 - 39	-	-	3
40 - 44	-	-	2
45 - 49	-	-	1
50 - 54	-	-	-
55 - 59	-	-	-
60 - 64	-	-	-
65 or over	-	-	-
UNKNOWN	-	-	-
TOTAL	-	-	49

Source: Saskatchewan Dental Hygenist's Association

TABLE XI.3.7

DENTAL HYGIENISTS - SASKATCHEWAN

NET MANPOWER REQUIREMENTS WESTERN CANADA REGION BY ALTERNATIVE SCENARIO

YEAR	STOCK	DENTISTS AT 1:2000	DENTISTS AT 1:1800	CURRENT POPULATION
1981	63	83	92	56
Net		20	29	(7)
1985	92	88	98	59
Net		(4)	6	(33)
1990	121	94	105	63
Net		(27)	(16)	(58)
1995	143	100	111	67
Net		(43)	(32)	(76)
2000	160	105	116	70
Net		(55)	(44)	(90)

o Estimating Requirements

- Historical Ratio

  The current Saskatchewan ratio of 1 dental hygenists to 17,550 population, was used to project the number of dental hygenists required in the future to maintain the current level of manpower.

- Ratio of Dental Hygenists to Dentists

  The current ratio of 1 dental hygenist to 587 dentists was used to project future manpower requirements.

o Net Manpower Requirements

The net manpower requirements under each projection approach are shown in Table XI.3.7 (opposite). The most likely scenario is based on the current ratio of hygenists to dentists calculated at a service target ratio of 1:2,000 under the medium population projection.

II-3 DENTAL ASSISTANTS

Table XI.3.8

Province: SASKATCHEWAN
Occupation: DENTAL ASSISTANTS

Year	Number of Practitioners	Population to Manpower
1971	23	1: 40270
1972	89	1: 10300
1973	128	1: 7090
1974	188	1: 4820
1975	220	1: 4170
1976	355	1: 2600
1977	457	1: 2050
1978	562	1: 1690
1979	651	1: 1470
1980	736	1: 1310

Source:

Table XI.3.9

Factors Affecting Manpower Supply

Province: SASKATCHEWAN
Occupation: DENTAL ASSISTANTS

Factor	Assumption	Source
Opening Stock	736	S.D.N.A.A.[2]
Net Migration	1 for all years	S.D.N.A.A.
Net Immigration	Zero for all years	S.D.N.A.A.
Net Occupational Shift[1]	-10% of stock	Estimates[3]
Training Output	80 for all years	S.D.N.A.A.
Attrition	Actual Retirement	S.D.N.A.A.

Notes:

[1] Includes Active/Inactive Flows

[2] S.D.N.A.A. is Saskatchewan Dental Nurses and Assistants Association

[3] Estimates obtained from provincial associations from all provinces

PROVINCIAL ASSUMPTIONS

SASKATCHEWAN

a) Legal Controls

b) Assumptions

Table XI.3.8 (opposite), indicates the total number of dental assistants in Saskatchewan identified as active.

o Factors Affecting Manpower Supply

The assumptions made with respect to each of the factors which have the potential to affect manpower stock are shown opposite in Table XI.3.9. These factors include migration, immigration, training output and retirement. For each of these assumptions, the information source has been identified. The age distribution for active dental assistants is shown in Table XI.3.10.

o Confidence in Factors Affecting Manpower Stock

The assumptions made on manpower supply for respiratory technologists were developed on information made available by the Saskatchewan Dental Nurses and Assistants Association.

Under the Dental Professions Act all certified dental assistants must be lisenced by the College of Dental Surgeons of Saskatchewan. Information on migration, immigration and movement from active to inactive was based on estimates derived from the association. Specific age distribution information was obtained from the association, and retirement was assumed at age 60. The active to inactive movement was based on an assumption of -10% of active stock.

TABLE XI.3.10

TOTAL NUMBER OF ACTIVE DENTAL ASSISTANTS

IN SASKATCHEWAN BY AGE

AGE GROUP	MALE	FEMALE	TOTAL
20 - 24	-	-	336
25 - 29	-	-	281
30 - 34	-	-	75
35 - 39	-	-	18
40 - 44	-	-	11
45 - 49	-	-	9
50 - 54	-	-	8
55 - 59	-	-	1
60 - 64	-	-	2
65 or over	-	-	-
UNKNOWN	-	-	-
TOTAL	-	-	745

Source: Saskatchewan Dental Nurses and Assistants Association

TABLE XI.3.11

NET MANPOWER REQUIREMENTS - BY ALTERNATIVE SCENARIO

DENTAL ASSISTANTS - SASKATCHEWAN

		PROJECTED REQUIREMENTS			
YEAR	STOCK	DENTISTS AT 1:2000	DENTISTS AT 1:1800	CURRENT POPULATION DENTISTS AT	CURRENT POPULATION DENTAL ASSTS.
1981	741	1112	1171	745	741
NET		371	430	4	-
1985	762	1181	1311	791	790
NET		419	549	29	28
1990	780	1163	1402	843	844
NET		383	622	63	64
1995	788	1333	1482	893	893
NET		545	694	105	105
2000	790	1399	1554	937	937
NET		609	764	147	183

o Estimating Requirements

. Historical Ratio

For each province, the current ratio of 1 dental assistant to 1,311 population, was used to project the number of dental assistants required in the future to maintain to current level of manpower.

o Net Manpower Requirement

The net manpower requirements under each projection approach are shown in Table XI.3.11 (opposite). The most likely scenario is based on the current population ration of1:50,000 under the medium population projection.

II.1 DENTISTS

Table XI.4.1

Province: MANITOBA
Occupation: DENTISTS

Year	Number of Practitioners	Population to Manpower
1970	304	1: 3230
1971	312	1: 3170
1972	320	1: 3100
1973	340	1: 2930
1974	348	1: 2900
1975	355	1: 2870
1976	374	1: 2730
1977	387	1: 2660
1978	403	1: 2560
1979	407	1: 2570
1980	419	1: 2520

Source:

Table XI.4.2

Factors Affecting Manpower Supply

Province: MANITOBA
Occupation: DENTISTS

Factor	Assumption	Source
Opening Stock	419	M.D.A.[2]
Net Migration	-10% of stock	M.D.A.
Net Immigration	1 for all years	M.D.A.
Net Occupational Shift[1]	-5 for all years	M.D.A.
Training Output	36 for 1981 28 for 1982 30 for 1983 33 for 1984 30 for 1985-2000	M.D.A.
Attrition	Actual Retirement	M.D.A.

Notes:

[1] Includes Active/Inactive Flows

[2] M.D.A. IS MANITOBA DENTAL ASSOCIATION

PROVINCIAL ASSUMPTIONS

MANITOBA

a) Legal Controls

The Dental Association Act is the act regulating the practice of dentistry in the province of Manitoba.

The certification and licensing requirements are shown in Appendix III - 1 -Scope and Control of Practice.

b) Assumptions

Table XI.4.1 (opposite), indicates the total number of dentists in Manitoba identified as active.

o Factors Affecting Manpower Supply

The assumptions made with respect to each of the factors which have the potential to affect manpower supply are shown in Table XI.4.2 (opposite). These factors include migration, immigration, active to inactive movements, training output and retirement. For each assumption, the information source has been identified. The age distribution for active dentists is shown in Table XI.4.3.

o Confidence in Factors Affecting Manpower Supply

The assumptions made on manpower supply for dentists were developed from information made available by the Manitoba Dental Association.

There is a mandatory licensing requirement for dentists in the province of Manitoba, and the information on active stock, movements from migration, immigration and movement from active to inactive are considered to be accurate. Specific age distribution information was obtained from the Association, and retirement was assumed at age 65.

TABLE XI.4.3

TOTAL NUMBER OF ACTIVE DENTISTS

IN MANITOBA BY AGE

AGE GROUP	MALE	FEMALE	TOTAL
20 - 24	8	-	8
25 - 29	73	10	83
30 - 34	71	2	73
35 - 39	56	3	59
40 - 44	45	2	47
45 - 49	30	-	30
50 - 54	31	-	31
55 - 59	29	-	29
60 - 64	31	-	31
65 or over	23	-	23
UNKNOWN	-	-	-
TOTAL	397	17	414

Source: Manitoba Dental Association

TABLE XI.4.4

DENTISTS - MANITOBA

NET MANPOWER REQUIREMENTS: BY PROVINCE
BY ALTERNATIVE SCENARIO

	SERVICE TARGET Population Ratio			
SUPPLY	1:2515	1:2000	1:1900	1:1800
1981 - 431	422	531	559	591
Net	(9)	100	128	160
1982 - 435	424	534	562	595
Net	(11)	99	127	160
1983 - 437	427	537	568	600
Net	(10)	100	139	163
1984 - 450	430	541	569	601
Net	(20)	91	119	151
1985 - 461	433	544	573	605
Net	(28)	83	112	144
1990 - 508	447	562	592	625
Net	(61)	54	84	117
1995 - 558	459	577	608	642
Net	(99)	19	50	84
2000 - 605	469	590	621	656
Net	(136)	(15)	16	51

o Estimating Requirements

. Historical Ratio

The current Manitoba ratio of 1 dentist to 2,516 population, was used to project the number of dentists required in the future to maintain the current level of manpower.

. Service Target Ratio

The service target ratio of 1 dentist to 2,000 population, was used to determine a reasonable requirement level of dentists to attain by the year 2000.

o Net Manpower Requirement

The net manpower requirements under each projection approach are shown in Table XI.4.4 (opposite). The most likely scenario is based on a service target ratio of 1:2,000 under the medium population projection.

II.2 DENTAL HYGENISTS

Table XI.4.4

Province: MANITOBA
Occupation: DENTAL HYGENISTS

Year	Number of Practitioners	Population to Manpower
1974	121	1: 8350
1975	126	1: 8080
1976	132	1: 7740
1977	144	1: 7150
1978	154	1: 6710
1979	165	1: 6340
1980	169	1: 6240

Source:

Table XI.4.5

Factors Affecting Manpower Supply

Province: MANITOBA
Occupation: DENTAL HYGENISTS

Factor	Assumption	Source
Opening Stock	169	M.D.A.[2]
Net Migration	Zero for all years	M.D.A.
Net Immigration	1 for all years	M.D.A.
Net Occupational Shift[1]	-5% of stock	ESTIMATES[3]
Training Output	16 for all years	M.D.A.
Attrition	Zero for all years	M.D.A.

Notes:

[1] Includes Active/Inactive Flows

[2] M.D.A. IS MANITOBA DENTAL ASSOCIATION - DENTAL HYGENISTS REGISTRY

[3] ESTIMATES OBTAINED FROM PROVINCIAL ASSOCIATIONS IN ALL PROVINCES

PROVINCIAL ASSUMPTIONS

MANITOBA

a) Legal Controls

b) Assumptions

Table XI.4.4 (opposite), indicates the total number of dental hygenists in Manitoba identified as active.

o Factors Affecting Manpower Supply

The assumptions made with respect to each of the factors which have the potential to affect manpower supply are shown in Table XI.4.5 (opposite). These factors include migration, immigration, active to inactive movements, training output and retirement. For each assumption, the information source has been identified. The age distribution for active dental hygenists is shown in Table XI.4.6.

o Confidence in Factors Affecting Manpower Supply

The assumptions made on manpower supply for dental hygenists were developed from information made available from the Manitoba Dental Association - Dental Hygenist Registry.

Under the Dental Health Worker's Act all qualified dental hygenists must be registered, and must hold a certificate issued by the Dental Health Worker's Board. Estimates of manpower movements from migration, immigration and movement from active to inactive were obtained from the Association. The active to inactive movement was based on an assumption of -5% of active stock. The age distribution was obtained from the association, and retirement was assumed at age 60.

TABLE XI.4.6

TOTAL NUMBER OF ACTIVE DENTAL HYGIENISTS

IN MANITOBA BY AGE

AGE GROUP	MALE	FEMALE	TOTAL
20 - 24	-	57	57
25 - 29	-	75	75
30 - 34	-	43	43
35 - 39	3	13	16
40 - 44	-	4	4
45 - 49	-	1	1
50 - 54	-	-	-
55 - 59	-	2	2
60 - 64	-	-	-
65 or over	-	1	1
UNKNOWN	-	-	-
TOTAL	3	196	199

Source: Manitoba Dental Association

TABLE XI.4.7

DENTAL HYGIENISTS - MANITOBA

NET MANPOWER REQUIREMENTS WESTERN CANADA REGION BY ALTERNATIVE SCENARIO

YEAR	STOCK	DENTISTS AT 1:2000	DENTISTS AT 1:1800	CURRENT POPULATION
1981	178	214	238	170
Net		36	60	(8)
1985	208	219	244	175
Net		11	36	(33)
1990	238	227	252	180
Net		(9)	14	(58)
1995	261	233	259	185
Net		(28)	2	(76)
2000	279	238	264	189
Net		(41)	(15)	(90)

o Estimating Requirements

. Historical Ratio

The current Manitoba ratio of 1 dental hygenist to 6,240 population, was used to project the number of dental hygenists required in the future to maintain the current level of manpower.

. Ratio of Dental Hygenists to Dentists

The current ratio of 1 dental hygenist to 248 dentists was used to project future manpower requirements.

o Net Manpower Requirement

The net manpower requirements under each projection approach are shown in Table XI.4.7 (opposite). The most likely scenario is based on the current ratio of dental hygenists to dentists calculated at a service target ratio of 1:2,000 under the medium population projection.

II-3 DENTAL ASSISTANTS

Table XI.4.8

Province: MANITOBA
Occupation: DENTAL ASSISTANTS

Year	Number of Practitioners	Population to Manpower
1980	610	1: 1730

Source:

Table XI.4.9

Factors Affecting Manpower Supply

Province: MANITOBA
Occupation: DENTAL ASSISTANTS

Factor	Assumption	Source
Opening Stock	610	ESTIMATES[2]
Net Migration	1 for all years	ESTIMATES[4]
Net Immigration	Zero for all years	ESTIMATES[4]
Net Occupational Shift[1]	-10% of stock	ESTIMATES[3]
Training Output	56 for all years	ESTIMATES
Attrition	Actual Retirement	ESTIMATES[4]

Notes:

[1] Includes Active/Inactive Flows

[2] ESTIMATES BASED ON REPORT S.3, DIVISION OF HEALTH SERVICES RESEARCH AND DEVELOPMENT, U.B.C.

[3] ESTIMATES OBTAINED FROM PROVINCIAL ASSOCIATIONS FOR ALL PROVINCES

[4] ESTIMATES BASED ON PATTERN OF MANPOWER MOVEMENTS FROM PROVINCE OF SASKATCHEWAN

PROVINCIAL ASSUMPTIONS

MANITOBA

a) Legal Controls

b) Assumptions

Table XI.4.8 (opposite), indicates the total number of dental assistants in Manitoba identified as active.

o Factors Affecting Manpower Supply

The assumptions made with respect to each of the factors which have the potential to affect manpower stock are shown opposite in Table XI.4.9 (opposite). These factors include migration, immigration, training output and retirement. For each of these assumptions, the information source has been identified. The age distribution for active dental assistants is shown in Table XI.4.10.

o Confidence in Factors Affecting Manpower Supply

Membership in the Manitoba Dental Nurses and Assistants Association is not mandatory, and estimates obtained from this source were very much understated. In order to develop a realistic current population ratio the pattern of utilization of dental assistants developed in British Columbia in report S3 - Estimated Available positions for Dental Auxiliary Manpower in British Columbia, Division of Health Services Research and Development, University of British Columbia, was superimposed on the Manitoba dentists. Information on movements from migration, immigration and movement from active to inactive was based on estimates derived from the parallel movements in the province of Saskatchewan. The Saskatchewan age distribution was superimposed on the derived stock, and retirement was assumed at age 60. The active to inactive movement was based on an assumption of -10% of active stock.

TABLE XI.4.10

TOTAL NUMBER OF ACTIVE DENTAL ASSISTANTS

IN MANITOBA BY AGE

AGE GROUP	MALE	FEMALE	TOTAL
20 - 24	-	-	275
25 - 29	-	-	230
30 - 34	-	-	62
35 - 39	-	-	15
40 - 44	-	-	9
45 - 49	-	-	7
50 - 54	-	-	7
55 - 59	-	-	1
60 - 64	-	-	3
65 or over	-	-	1
UNKNOWN	-	-	-
TOTAL	-	-	610

Source: Age distribution based on Saskatchewan age distribution.
Stock figure based on 1.39 C.D.A. per dentist.

TABLE XI.4.11

NET MANPOWER REQUIREMENTS - BY ALTERNATIVE SCENARIO

DENTAL ASSISTANTS - MANITOBA

		PROJECTED REQUIREMENTS			
YEAR	STOCK	DENTISTS AT 1:2000	DENTISTS AT 1:1800	CURRENT POPULATION DENTISTS AT	CURRENT POPULATION DENTAL ASSTS.
1981	610	769	857	612	614
NET		159	247	2	4
1985	708	788	877	628	630
NET		80	169	-80	-78
1990	769	815	906	648	643
NET		46	137	-121	-126
1995	801	836	931	665	668
NET		35	130	-136	-133
2000	820	855	951	680	683
NET		35	131	-140	-137

distribution was superimposed on the derived stock, and retirement was assumed at age 60. The active to inactive movement was based on an assumption of -10% of active stock.

o Estimating Requirements

. Historical Ratio

The current Manitoba ratio of 1 dental assistant to 1,730 population, was used to project the number of practitioners required in the future to maintain to current level of manpower.

o Net Manpower Requirement

The net manpower requirements under each projection approach are shown in Table XI.4.11 (opposite). The most likely scenario is based on the current population ratio under the medium population projection.

APPENDIX III - SCOPE OF PRACTICE

III-1 Dentists: CONTROL OF PRACTICE

Certification/Licensing/Registration

Province/Legislation	Required Characteristics of Applicants	Registration Requirements	Licensing Requirements
British Columbia Dentists Act R.S. Chapter 92 - 1979	- Good moral character - 19 years of age	- Pass examination prescribed by Council of College of Dental Surgeons - Payment of examination and registration fees - Produces a certificate of a degree in dentistry from approved university of 10 year practice of dentistry in other province of Canada	—— - ——
Alberta The Dental Association Act Chapter 90, Revised Statutes Alberta 1970; Amendments May 1980	- Good moral character - 18 years of age	- Satisfactory academic qualification - Degree in dentistry from U of A - Pass examination set by Universities Co-ordinating Council, OR - satisfies Council the academic standing is equivalent to those in Alberta at time of registration - Must have been active in dentistry during prior 5 years	—— - ——
Saskatchewan The Dental Profession Act 1978 - R.S.S. 1978 Chapter D-5.1 Saskatchewan Regulation 278/79	- Good charachter - Full legal age	- Payment of required fees - Graduate of Canadian school or faculty of dentistry, approved by Council on Education of Canadian Dental Association - Graduate of approved American school or faculty of dentistry - Holder of rated certificate from National Dental Examining Board or Dominion Dental Council or Dental Council of Canada	—— - ——
Manitoba Dental Association	- Good moral character - No criminal record	- Evidence of qualification by undergoing examination established by University of Manitoba - Payment of prescribed fees - Holder of certificate of qualification of Dominion Dental Council, and having praticed dentistry in each of the last 5 years - Holder of National Dental Examining Board of Canada, practiced in each of the last 5 years	—— - ——

APPENDIX IV - BIBLIOGRAPHY

BIBLIOGRAPHY ON DENTAL OCCUPATIONS

DENTAL AUXILIARY

Girardin, D. "Brief Presented By The Canadian Dental Hygienists' Association to the Health Services Review Commission" - A Summary, The Canadian Dental Hygienist, Volume 14, No. 2, Summer 1980.

Canadian Dental Hygienist's Association, "Brief Presented By the Canadian Dental Hygienists' Association to the Health Services Review 1979", April, 1980.

Lewis, D.W. et al., "Demographic and Employment Profile of Dental Hygienists in Canada 1979", Research Report No. 40, Dental Manpower Report No. 12, Dental Health Care Services Research Unit, Faculty of Dentistry, University of Toronto.

Division of Health Services Research and Development, Health Sciences Centre, University of British Columbia, "Estimated Available Positions for Dental Auxiliary Manpower in British Columbia Present and Projected to 1980", Report S:3, February, 1979.

Dental Update, "The Role of the Dental Ancillary of the Future", September/ October 1976.

Hollister, Lynne P., "The Status of Dental Assistants: A Review of the Literature from 1972 - 1978", Dental Hygienists, Volume 53, August, 1979.

Koerner, R. L., DDS, "Legislating Auxiliary Utilization", The Dental Assistant, October, 1975.

Ohio Dental Journal, "Position on Dental Manpower and Expanded Function", March, 1975.

Kolar, M.J., "Changing Patterns of Health Care Delivery: Impact on Dental Auxiliaries", Educational Directions, Volume 2, No. 2.

Saskatchewan Dental Plan Report, Department of Health, August, 1975, August 1976, August 1977.

Saskatchewan Health Dental Plan Annual Report. 1977 - 1978, 1978 - 1979, 1979 - 1980.

Davey, K.W. "Delivering Dental Care in the Canadian North." Hospital Administration in Canada, March, 1975.

Overturf, J.R. "Too Few Patients? Count Your Auxiliaries." American Journal of Orthodontists, August, 1978.

Obuhoff, O.N. "Growth to Maximum Use of Auxiliaries. General Dentistry, March/April 1977.

Obuhoff, O.N. "Auxiliary Utilization: Increasing Productivity and How To Survive It" Transcript of Conference on Private Practice, Council of Dental Health, American Dental Association, July, 1974.

Conley, J.F., Steinberg, J.A. "Dental Auxiliaries-Changing Time = Changing Roles." Journal, Canadian Dental Association,November, 1978.

Association for Academic Health Centres, "Position on Dental Manpower and Expanded Function." Ohio Dental Journal, March, 1975.

Clemens, K.M. "The Battle Lines Are Drawn," Editorial, Journal of American Dental Association, January, 1976.

Thompson, G.W., et al, "The Ontario Dental Association Demonstration Project on Dental Auxiliaries With Expanded Duties." Ontario Dentist, Volume 52, No. 11, November, 1975.

Suggs, D.M.E., "Evaluating the Effectiveness of Dental Expanded Duty Personnel Utilization."

Sisty, N.L., et al, "Review of Training and Evaluation Studies in Expanded Functions for Dental Auxiliaries." Journal of American Dental Association, Volume 98, February, 1979.

Bezroukov, V., "Structure and Types of Dental Manpower," World Dental Health, W.H.O., Volume 29, No. 3.

Pelton, A.J., "Public Health Dental Auxiliary Training Program at The Pas, Manitoba," Journal of Canadian Dental Association, No. 6, 1975.

Forgay, M.G.E., "Educating the Dental Auxiliary: What Comes Next? A Personal View" Journal of Canadian Dental Association, No. 6, 1975.

Swanstorm, R.L. "The Effects of Preventive Dentistry and Treatment Productivity on Dental Health Manpower Needs," Northwest Dentistry, January/February, 1977.

Kaplis, N.A., Bentley, M., "Costs of Training EFDAS for a TEAM Program," Journal of Dental Education, Volume 43, No.5, 1979.

Barr, C.E., "Dental Assistant Utilization for Practising Dentists and Their Assistants."

Bischoff, R.J., Hartley, L.S., "Expanded Duty Dental Assistants - What are their Limitations?" Journal of Kentucky Dental Association, October, 1975.

Anderson, A.R., "The Dental Assistants" Journal of the New Jersey Dental Association, Summer, 1976.

Report XII - DIETICIANS

Krauss, T.C. "The Basic Expanded Duty Dental Auxiliary" Journal of the Colorado Dental Association, September, 1975.

Keywood, O., "The Work of Dental Hygienists and Auxiliaries." Nursing Times, February 8, 1979.

Cohen, L.A., "Some Variables Affecting Dentists' Desire to use Expanded Duty Dental Auxiliaries," Journal of American Dental Association, Volume 97, December, 1978.

Dreuth, M., "The Dental Auxiliary - CLEP Examinations - One Year Later" The Dental Assistant, March/April, 1978.

Volz, F., "Dental Assisting Education in Community Colleges," The Dental Assistant, March/April, 1978.

Gift, H.C., "Utilization of Auxiliaries and Attitudes of Dentists Toward the Delegation of Duties." Journal of American Dental Association, Volume 93, December, 1976.

Jacobs, R.M., "Reflections on the Controversy over Expanded Function Dental Auxiliaries." Journal of Dental Education, Volume, 40, No.3, 1976.

Franklin, D.R., "External Factors Leading to the Loss of Professional Control of the Delivery of Oral Health Care." Journal of the American College of Dentists, October, 1977.

Quartararo, I.N., "Auxiliaries - A Perspective" NYS Dental Journal, August/September, 1978.

Seidel, J.C., "Expanded Duty Needs Definition", February, 1977.

McLinn, H.M., "Living with Expanded Duty Functions in an Age of Dental Care "Transition"", Journal of the American Dental Association.

Waldman, H.B., "The Reaction of the Dental Profession to Changes in the 1970's" American Journal of Public Health, Volume 70, No. 6, June, 1980.

Schon, F., "The Working Concept of Modern Dentistry and Dental Team Work" Journal of the Dental Association of South Africa, January, 1975.

Slaughter, F.C., "Expanded Functions: An Honest Appraisal" Operative Dentistry, Volume 2, 1977.

Hamilton, A.I., "Expanded Duties: An Economic Fallacy" Editorial - Operative Dentistry, Volume 2, 1977.

MacFarlane, D.E., "Report to the Canadian Dental Association Council on Health Care" Oral Health, August, 1974.

Petrie, M.J., "Future of Non-Operating Dental Auxiliaries" Oral Health, August, 1974.

Roemer, R., "Credentialing Dental Auxiliary Personnel." The Dental Assistant, May, 1976.

Taylor, L.F., "The Use of Expanded - Duty Dental Auxiliaries" New Zealand Dental Journal, July, 1976.

Occhionero, R.L., "Auxiliary Programs - Their Impact on Expanded Functions Legislation' The Dental Assistant, September/October, 1978.

Koener, R.L., Duff, G. Hopkins, L.J., Kemp, W.J., "Legislating Auxiliary Utilization" The Dental Assistant, October, 1975.

Waldman, H.B., "Will Dentistry Eventually Make Use of Expanded Duties and Denturism" Dental Survey, November, 1976.

Butler, N.P., "An Analysis of the Titles and Job Specifications of Operating Dental Auxiliaries" Quintessence International, Volume 8, 1977.

D.H.E.W., "A Report to the President and Congress on the Status of Health Professions Personnel in the United States" United States Department of Health, Education and Welfare.

Health and Welfare Canada, "Dental Manpower/Population Ratio Estimates for Canada Under Four Situations" Health Manpower Report, No. 1 - 73.

Health and Welfare Canada, "Categories of Dental Auxiliaries in Canada by Province - 1973" Health Manpower Report No. 10 - 74.

Durning, J.M. "Dental Care For Everyone", 1976.

Canadian Dental Association "Dental Health of Canadians, A Perspective" A Brief, March, 1980.

University of Alberta, "Report of Committee of Dental Services to Rural Areas" Senate, University of Alberta, 1976.

Rafferty, J., "Health Manpower and Productivity" 1974, Lexington Books.

DENTISTS

Lewis, D.W., "Research Into Dental Manpower in Ontario--A Summary of Concerns and Findings", Research Report, Dental Health Care Services Research Unit, April, 1981.

Lewis, D.W., "Canadian Dental Manpower - Supply, Distribution, Requirements", Research Report, Dental Health Care Services Research Unit, October, 1977.

House, R.K., and Associates, Report on Dentistry, 1980, April, 1980.

Gift, H.C., "A Study of Dental Manpower For New York State*", New York State Dental Journal, Volume 45, November, 1979.

Dental Student, "'Dentist Manager' Concept Pioneers Dentistry of the Future", January, 1975.

Hicks, L.L., "Analysis of Dental Manpower Needs", Journal of the Missouri Dental Association, Volume 56, January, 1976.

Meskin, L.H., "too Many Dentists? If So, What Then?", Journal of Dental Education, Volume 41, October 1977.

Levine, D.U., Mares, K.R., "Measuring Dental Manpower", Missouri Dental Association Journal, Volume 59, February, 1979.

Corby, C.S., "Too Many Dentists?", Dental Economics, Volume 68, April, 1978.

Douglas, B.L., Babeaux, W.L., "The Dental Manpower Demands-Versus-Needs Dilemma", Illinois Dental Journal, Volume 46, February, 1977.

Weiss, J.R., Signer, M.M., "Manpower Planning: Its Impact on Dentistry", Dental Abstracts, Volume 24, August, 1979.

Gish, C.W., Smith, C.E., "Dental Manpower - A Productivity Index Developed to Relate to Demand and Dental Disease", Indiana Dental Association Journal, Volume 54, March/April, 1975.

Hirsch, G.B., Killingsworth, W.R., "A New Framework for Projecting Dental Manpower Requirements".

Henderson, W.G., "Measuring the Supply and Demand for Dentists in a Population", AJPH, Volume 66, January, 1976.

Bradley, R.E., "Dental Education and Manpower", Journal of the Nebraska Dental Dental Association, Volume 52, Spring, 1976.

Haynes, S., "A Quantitative Study of General Dental Practitioner Orthodontic Care in Scottish Health Board Areas (1966 - 1975)", British Journal of Orthodontics, Volume 6, October, 1979.

Bureau of Economic and Behavioral Research, "Estimated Number of Professionally Active Dentists, 1978 to 1990", Journal of the American Dental Association, Volume 99, July, 1979.

Klinger, L.A., "1976 - 2076", The Dental Assistant, July, 1976.

Klooster, J., "Dental Manpower: An Overview - It's a Numbers Game...But Which Numbers?", Canadian Dental Association Journal, February, 1980.

Engler, D., "The Supply and Demand of Dental Care in Tennessee", Journal of the Tennessee Dental Association, Volume 59.

Spratley, M.H., "Dental Manpower in Victoria", Australian Dental Journal, June, 1979.

Denton, D.R., "Manpower and the Feds: Government Shifts Focus on Dental Planning", Canadian Dental Association Journal, February, 1980.

Leonard, M.S., Watkins, S., "Manpower: Another Look", Oral Surgery, Volume 38, December, 1980.

Clappison, R.A., "Dental Manpower - A Look at the Real World", Oral Health, Volume 70, No. 1, January, 1980.

Lemke, C.W. et al, "Wisconsin Dental Manpower Study", Wisconsin Dental Association, May, June,

Field, H.M. et al, "Iowa Dental Manpower - Number of Dentists Practicing in Iowa*", Iowa Dental Journal, January, 1980.

Overturf, J.R., "Too Few Patients? Count Your Auxiliaries", American Journal of Orthodontists, August, 1978.

PROVINCIAL HEALTH MANPOWER REFERENCE SOURCES

BRITISH COLUMBIA

- Rollcall 79 - A Status Report of Health Personnel in the Province of British Columbia.
  Report R:12
  Division of Health Services Research and Development
  Health Sciences Centre,
  University of British Columbia.

- Rollcall Update 80 - A Status Report of Selected Health Personnel in the Province of British Columbia.
  Report R:16
  Division of Health Services Research and Development
  Health Sciences Centre,
  University of British Columbia.

ALBERTA

Health and Social Service Manpower in Alberta 1980

Alberta - Health and Social Services
Disciplines Committee.

SASKATCHEWAN

Annual Report 1978 - Saskatchewan Health Manpower

Saskatchewan Health.

MANITOBA

Health Manpower Provincial Report - Manitoba 1980.

Manitoba - Department of Health
Research Section.

Province of
British Columbia

Province of
Alberta

Province of
Saskatchewan

Province of
Manitoba

WESTERN CANADA
HEALTH MANPOWER TRAINING STUDY

Category # 3 Report XII

DIETICIANS

REPORT XII

DIETICIANS

THE REQUIREMENT FOR ALTERNATIVE TRAINING AND FUNDING ARRANGEMENTS IN WESTERN CANADA

REPORT XII

DIETICIANS

TABLE OF CONTENTS

PAGE

I. INTRODUCTION

Study Background 1
Study Objectives 1
Study Approach 2
Occupation Definition 4

II. TRAINING NEEDS IN WESTERN CANADA

Manpower Requirements 5
Existing Training Program 6
Occupational Issues 7

III. TRAINING RESPONSES

Decision Process 10
Timing and Location of Manpower Requirements 10
Indicated Manpower Responses 11

IV. RECOMMENDATIONS 14

APPENDIX I - Study Approach and Methodology
APPENDIX II - Provincial Net Manpower Requirement
APPENDIX III - Scope of Practice
APPENDIX IV - Bibliography

I. INTRODUCTION

STUDY BACKGROUND

The provision of effective health services to the community is, to a considerable degree, dependent on three essential resources:

- an adequate supply of well trained specialist staff in each health occupation group
- the development of adequate facilities to service the community
- the availability of adequate funds to ensure cost-effective and efficient health services.

The range and complexity of health treatment programs has expanded greatly in Canada during the last twenty-five years. In addition, changing technology and the development of new treatment programs have resulted in an increased requirement for skilled, adequately trained health manpower. These factors have resulted in an increased emphasis on manpower planning and skill training for health occupations to ensure an adequate supply of trained practitioners to meet defined manpower requirements.

STUDY OBJECTIVES

The Western Canada Health Manpower Training Study was initiated by the western Premiers at their annual conference in 1980. The study terms of reference contain two major objectives. These are:

- to assess the existing and future needs for health manpower training programs and facilities in western Canada

- to make recommendations for the rationalization of the location and funding of health manpower training programs and facilities in western Canada.

STUDY APPROACH

The study was under the direction of a Steering Committee consisting of health and education representatives from the provinces of British Columbia, Alberta, Saskatchewan and Manitoba. The study took place over two years and consisted of a review of 26 health occupations grouped into five categories. Each occupation has been studied separately and a report has been produced for each. In addition, a report examining the inter-relations of the occupations has been submitted to the Steering Committee.

Data was collected from provincial and national associations and from government agencies for each of the occupations on the numbers of individuals registered with the associations and their current status as active or inactive practitioners. An attempt was also made to gather data on historical trends, the number of graduates from training, trends in movement of active practitioners to inactive status, occupational shifts out of the profession, trends in migration to and from other provinces, and immigration and emigration.

In the cases where validated and reliable information was not available, association spokesmen, employers and individuals in each of the occupations were interviewed to provide opinions regarding present and future trends affecting the manpower supply and requirement.

A literature review was conducted to examine the problems facing each occupation. A bibliography of the material reviewed is contained in Appendix D.

A health manpower computer model was developed to assist in the preparation of projections on the future supply and requirement for each occupation. A critical analysis of these twenty-year projections was then undertaken to develop the various supply and requirement scenarios presented in this report.

Separate documents describing the manpower planning methodology and the training decision-making process were issued. A brief summary of the overall study approach and methodology is set out in Appendix I and details of the provincial net requirements are set out in Appendix II.

OCCUPATION DEFINITION

This report addresses the need for training programs for dieticians ineach of the four provinces. For the purpose of this study, a dietician is defined as an individual who:

"plans and supervises food service programs in governmental, institutional and commercial establishments to provide nutritionally adequate quality food. Plans diets and menus and evaluate clients' acceptance. Establishes and maintains standards of food production and service, sanitation, safety and security. Supervises workers and directs efficient use of personnel and equipment. Institutes measures to improve efficiency and quality of food service systems. Plans, conducts and evaluates orientation and in-service training programs. Determines food, equipment and supply requirements. Administers established personnel policies. Plans layout designs and determines equipment requirements for new or renovated food services facilities. Prepares material on nutritional value of foods, methods of preparation and recipes, if required."[1]

The report includes dieticians who are working in a hospital setting and dieticians who are employed in industry, the community and in the government. In practice they may be refered to as a dietician or nutritionist. Dietician is the designation usually given to individuals employed in hospital settings, as nutritionist is a more common designation given to individuals out of hospital settings. Not all nutritionists are qualified to work as dieticians, however, currently, most dieticians have th qualifications to work as nutritionists. This interconnection of roles is seen to be changing (see Occupational Issues).

1 Canadian Classification and Dictionary of Occupations, No. 3152, 1980 - Revision.

EXHIBIT 1: MANPOWER REQUIREMENTS

WESTERN CANADA: DIETICIANS

YEAR	PROJECTED STOCK	PROJECTED REQUIREMENT	
		POPULATION RATIO[1]	SERVICE TARGET RATIO[2]
1981	797	798	982
		Net 1	185
1982	811	817	1005
		Net 6	197
1983	828	837	1028
		Net 9	200
1984	844	855	1051
		Net 11	207
1985	861	873	1072
		Net 12	211
1990	918	960	1176
		Net 42	258
1995	954	1040	1271
		Net 86	317
2000	977	1113	1361
		Net 136	384

Note: 1- POPULATION RATIOS

British Columbia	1:8,520
Alberta	1:7,947
Saskatchewan	1:11,625
Manitoba	1:8,240

2- SERVICE TARGET RATIO
1:7,000

II TRAINING NEEDS IN WESTERN CANADA

This section presents the statistical data for manpower requirements for western Canada, reviews the basis for projection and the confidence in basic data, existing training programs for dieticians, and reviews the major issues influencing the occupation.

MANPOWER REQUIREMENTS

Exhibit 1, opposite, shows the projected stock and requirement under two different scenarios for dieticians in western Canada during the period 1981 - 2000.

Two scenarios have been established using different approaches to determine manpower requirements. The first uses a constant 1980 provincial population ratio for each of the western provinces. The approach assumes that each of the western provinces will require the same number of dieticians per population as was determined in 1980.

Using this approach the net manpower situation for dieticians in western Canada indicates a requirement of 136 dieticians by the year 2000.

The second approach used to determine requirements is the service target ratio. This approach identifies a ratio of 1 dietician to 7,000 population as a reasonable requirement level to reach by the year 2000. (The basis for this service target is discussed in more detail in Appendix II).

When using the service target approach the manpower situation for dieticians in western Canada indicates a requirement of 384 dieticians by the year 2000.

TABLE 1

TRAINING PROGRAMS FOR DIETICIANS IN WESTERN CANADA

	Average Number of Graduates
British Columbia	
University of British Columbia	28
Alberta	
University of Alberta	20
Saskatchewan	
University of Saskatchewan	13
Manitoba	
University of Manitoba	22
Western Canada Total:	83

The service target approach of 1;7,000, under a medium population growth has been determined as the most likely scenario. This ratio is seen as an optimum ratio and does not necessarily reflect the current situation. Training recommendations for this scenario were developed to reach a relative balance situation between the supply and requirement of dieticians by the year 2000. The ability to reach this balance is largely dependent on the availability of and level of government budgetary allocations and the priority to attain an optimum level of dietetic services.

DEGREE OF CONFIDENCE IN DATA

The projected stock has been developed on the basis of historical patterns and estimates of immigration, migration and occupational shift, and projected attrition from retirement at the age of 65. The training component includes the number of students in each province who obtain dietetic internships.

The information for these projections have been derived from association records and estimates, and government data. In general, the information contained in these records has an acceptable level of accuracy and the projections for dieticians are considered to be acceptable for the purposes of these projections. The stock includes individuals who have been trained as dieticians. These dieticians may be employed as either a dietician or nutritionist. Dietician is the usual designation given to an individual employed in a hospital setting as, nutritionist is the more common designation given to an individual employed out of a hospital setting.

EXISTING TRAINING PROGRAMS

Table 1, opposite, shows the location of, and the average number of graduates from the four programs in western Canada which provide the academic training required to prepare individuals to pursue careers as

TABLE 2

NUMBER OF DIETETIC INTERNSHIP POSITIONS
IN EACH OF THE WESTERN PROVINCES

	Dietetic Internship Positions
British Columbia	20
Alberta	29
Saskatchewan	7
Manitoba	17[1]
Western Canada Total	73

SOURCE: Canadian Dietetic Association - August 1980

Note: 1 - The total number of Dietetic Internship Positions will be increasing in Manitoba to a total of 21 by 1983.

dieticians. This training is provided through the Food and Nutrition program of the Home Economics Faculty.

After graduation from the Food and Nutrition program, students are usually eligible to apply for internships in dietetics. This dietetic internship is required before an individual is qualified to work as a professional dietician. Dietetic internships are only available through health institutions which have been accedited by the Canadian Dietetic Association. Table 2, opposite, shows the number of dietetic internships in each of the western provinces.

For more detailed discussion on these training programs, please refer to Report 3-A, "The Scope of Existing Training Programs, Category III Occupations".

OCCUPATIONAL ISSUES

The supply and requirements for dieticians is western Canada are influenced by a number of general trends and issues. These are:

Historical and Current Trends

- Developing Role

  - Traditionally dieticians have worked in a therapeutic and administrative role in active treatment hospitals. Their role in therapeutic counseling has expanded and the additional need for dietetic services in outpatient counseling and in extended care settings has been recognized. This expansion of role has resulted in a increased requirement for dieticians.

- The demand in the community for individuals with nutritional backgrounds has also increased. Areas where the demand has grown are public health, home care, private industry, social services and education system. This, in turn, increases the requirement for dieticians.

o Community Internships

- As a result of this increased demand for nutritional services in the community, the development of community internships, (as opposed to dietetic internships), has been considered. In addition it has been suggested that individuals working in the community require a masters degree. The development of community nutrition internships, and the requirement for specific post-graduate qualifications may limit the ability for dieticians to move into the community area. This would decrease the requirement for dieticians.

o Proportion of Female Practitioners

- Currently it is estimated that approximately 99.5% of active dieticians are female. This high proportion of female dieticians is expected to continue.

o Pattern of Employment

- Based on survey data from the provinces of Alberta and Saskatchewan, it is estimated that approximately 72% of dieticians work full time. Limited information is available on the number of part-time hours worked per week, therefore the calculation of full time equivalent practitioners has not been attempted. Actual

requirements for dieticians are greater if ratios between part-time and full time participation are taken into consideration.

Situations Likely to Occur with Major Policy Changes

o Future of Community Nutrition Programs

- The future trends in community nutrition are dependent on public policy decisions, and the level of committed funding to these programs. If the decision is made to provide the required nutritional services, the requirement for individuals with qualifications to work in these areas will increase.

- It is anticipated that decisions on the need for post-graduate qualifications for community nutrition will effect the future training of dieticians.

o Expanded Role of Dieticians

- Currently, hospital policies and provincial standards determine requirement levels for dieticians in the hospital setting. These may include policies on food services, the ratio of dieticians per patient, and the need for dieticians in specific areas. If significant changes were made in these standards and policies the requirement for dieticians would be effected.

EXHIBIT 2

NET MANPOWER REQUIREMENTS BY PROVINCE

OCCUPATION: DIETICIANS

YEAR	BRITISH COLUMBIA		ALBERTA		SASKATCHEWAN		MANITOBA	
	POPULATION RATIO[1]	SERVICE TARGET[2]	POPULATION RATIO[1]	SERVICE TARGET[2]	POPULATION RATIO[1]	SERVICE TARGET[2]	POPULATION RATIO[1]	SERVICE TARGET[2]
1981	0	68	4	41	-2	54	-1	22
1982	1	71	9	47	-4	53	-2	23
1983	3	74	14	53	-4	53	-4	20
1984	3	76	18	59	-5	53	-5	19
1985	4	78	20	62	-6	53	-5	18
1990	10	91	45	93	-6	57	-4	17
1995	16	103	82	135	-3	63	-9	16
2000	30	123	120	180	-3	66	-11	15

NOTE: 1- POPULATION RATIOS

British Columbia	1:8,520
Alberta	1:7,947
Saskatchewan	1:11,625
Manitoba	1:8,240

2- SERVICE TARGET RATIO
1:7,000

III TRAINING RESPONSES

DECISION PROCESS

The decision process outlined in Appendix I and discussed in detail in Report C, "A Decision Process To Evaluate the Location of, and Funding Arrangements For Health Occupation Training Programs in Western Canada", was used to evaluate the training implications of the net manpower requirements for dieticians discussed above. This section contains the results of this analysis.

TIMING AND LOCATION OF MANPOWER REQUIREMENTS

Exhibit 2, opposite, shows the projected net manpower requirements for dieticians in each of the western provinces for the period 1981 - 2000. The projections are developed on both a constant 1980 provincial population ratio and a service target ratio of 1:7,000. The most likely scenario for dieticians has been determined using the service target ratio approach.

British Columbia

Under the 1980 population ratio, British Columbia develops a requirement for 10 dieticians by 1990 and 30 dieticians by the year 2000. This approximates to an average annual requirement of 2 dieticians over the 20 year period. Under the service target ratio approach the requirement increases to 123 dieticians by the year 2000, or an average requirement for 6 dieticians a year.

Alberta

In Alberta, using the population ratio approach a requirement for 45 dieticians is indicated for 1990 and for 120 dieticians by the year 2000.

This approximates to an average annual requirement for 6 additional dieticians. Under the service target approach the requirement increases to 180 dieticians by the year 2000 or an annual average of approximately 9 additional dieticians. This requirement has been determined as the most likely scenario.

Saskatchewan

In Saskatchewan, a surplus of 3 dieticians is determined by the year 2000 based on the 1980 population ratio. Under the service target ratio there is a requirement for 66 additional dieticians by the year 2000, or an approximate average annual requirement for 4 dieticians. The training recommendations for Saskatchewan are based on meeting this requirement by the year 2000.

Manitoba

In Manitoba, there is a potential surplus of 11 dieticians based on the population ratio approach. Under the services target ratio approach the surplus is reduced to a requirement for an additional 15 dieticians by the yer 2000.

INDICATED MANPOWER RESPONSES

Individuals wishing to pursue a career as a dietician usually require a degree through a Food and Nutrition program and must have completed a dietetic internship. In the past there have been fewer individuals who receive dietetic internships than the number of people who graduate from Food and Nutrition programs.

TABLE 3

Average Number of Graduates from Food and Nutrition Programs and Average Number of Individuals Receiving Dietetic Intership

	Graduates	Dietetic Internships
British Columbia	28	18
Alberta	20	11
Saskatchewan	13	7
Manitoba	22	14
Western Canada Total	83	50

Note: Usually between 50% to 65% of the students graduating from Food and Nutrition programs obtain dietetic internships.

EXHIBIT 3

NET MANPOWER REQUIREMENTS BY PROVINCE AND REGION

SUPPLY INCLUDES THE NUMBER OF

STUDENTS GRADUATING FROM TRAINING

Occupation: DIETICIANS

Year	British Columbia		Alberta		Saskatchewan		Manitoba		Region	
	Stock	Req	Stock	Req	Stock	Req	Stock	Req	Stock	Req
1981	324	382	276	308	92	140	136	152	828	982
Net		58		32		48		16		154
1982	339	390	291	320	100	142	139	153	869	1005
Net		51		29		42		14		136
1983	353	398	305	332	108	144	142	154	908	1028
Net		45		27		36		12		120
1984	368	406	319	344	116	146	145	155	948	1051
Net		38		25		30		10		103
1985	382	414	333	354	123	148	148	156	986	1072
Net		32		21		25		8		86
1990	446	453	386	404	152	158	163	161	1147	1176
Net		7		18		6		-2		29
1995	499	488	420	451	173	167	175	165	1275	1271
Net		-11		31		-6		-10		-4
2000	536	519	446	498	192	175	185	169	1363	1361
Net		-17		52		-17		-16		-2

NOTE:

1 SUPPLY DETERMINED BASED ON THE TOTAL NUMBER OF STUDENTS GRADUATING FROM FOOD AND NUTRITION PROGRAMS

2 SERVICE TARGET RATIO
1:7,000

Table 3, opposite, below compares the average number of graduates in each province to the average number of individuals who receive dietetic internships.

This inter-relationship between the number of individuals who graduate, and the number of individuals who receive dietetic internships must be examined in the analysis of the manpower requirements for dieticians. The future supply of professionally qualified dieticians is potentially constrained by both factors:

- an adequate output of graduate from food and nutrition programs, and
- an adequate output from dietetic internships.

Thus the indicated manpower responses are discussed at two levels.

Level 1 - Training Outputs from Food and Nutrition Programs

Exhibit 3, opposite, shows the projected net manpower requirements for dieticians based on an assumption that all of the graduates from Food and Nutrition Programs are subsequently qualified as dieticians. This is not the actual situation, but shows whether the existing training programs are providing sufficient graduates to meet the future requirements for dieticians (assuming that adequate intern positions were made available).

In general, British Columbia, Saskatchewan and Manitoba are producing sufficient graduates to meet the requirement for dieticians. The province of Alberta is not producing enough graduates, indicating a need to increase the number of students graduating from the food and nutrition program.

EXHIBIT 4

NET MANPOWER REQUIREMENTS BY PROVINCE AND REGION

SUPPLY INCLUDES THE NUMBER OF

INDIVIDUALS RECEIVING INTERNSHIPS

Occupation: DIETICIANS

Year	British Columbia		Alberta		Saskatchewan		Manitoba		Region	
	Stock	Req	Stock	Req	Stock	Req	Stock	Req	Stock	Req
1981	314	382	267	308	86	140	130	152	797	982
Net		68		41		54		22		185
1982	319	390	273	320	89	142	132	153	811	1005
Net		71		47		53		23		194
1983	324	398	279	332	91	144	134	154	828	1028
Net		74		53		53		20		200
1984	330	406	285	344	93	146	136	155	844	1051
Net		76		59		53		19		207
1985	336	414	292	354	95	148	138	156	861	1072
Net		78		62		53		18		211
1990	362	453	311	404	101	158	144	161	918	1176
Net		91		93		57		17		258
1995	385	488	316	451	104	167	149	165	954	1271
Net		103		135		63		16		317
2000	396	519	318	498	109	175	154	169	977	1361
Net		123		180		66		15		384

NOTE:

1 SUPPLY DETERMINED BASED ON THE AVERAGE NUMBER OF GRADUATES OBTAINING DIETETIC INTERNSHIP POSITIONS

2 SERVICE TARGET RATIO
1:7,000

TABLE 4

DIETICIANS

AVERAGE NUMBER OF GRADUATES
and
INDIVIDUALS RECEIVING INTERNSHIPS
and
INTERNSHIP POSITIONS AVAILABLE

	Graduates	Individuals Receiving Internships	Internship Positions Available
British Columbia	28	18	20
Alberta	20	11	29
Saskatchewan	13	17	7
Manitoba	22	14	17 (21 as of 1983)
Western Canada Total	83	50	73 (77 as of 1983)

Level 2 - Output from Dietetic Internships

Exhibit 4, opposite, shows the projected net manpower requirements for dieticians developed on the outputs from dietetic internships. Based on these outputs there is a requirement for additional dieticians in British Columbia, Alberta, Saskatchewan and Manitoba.

Summary

Exhibit 3 indicates that in western Canada, on the average, an adequate number of students graduate from training programs to meet net manpower requirements by the year 2000. Exhibit 4 indicates the number of individuals receiving dietetic internships is not sufficient to meet manpower requirements. Based on this data, an average of 63 graduates a year would have to receive internship positions to meet manpower requirements for dieticians by the year 2000.

Table 4, opposite, compares the number of graduates from food and nutrition programs, the average number of graduates receiving internship positions and the number of internship positions available in western Canada. Although there are a sufficient number of dietetic internship positions available in western Canada, it would appear that there are an insufficient number of western Canadian graduates receiving dietetic internship positions. Government manpower strategies for dieticians in western Canada must include monitoring and adjusting the number of graduates receiving dietetic internships to ensure an adequate supply of qualified dieticians into the western Canada labour market.

IV RECOMMENDATIONS

Recommendations for each of the four provinces are set out below.

- **British Columbia**

  .1- That there be no changes in the number of enrolments in the Food and Nutrition Program at the University of British Columbia.

  .2- That the province of British Columbia monitor the number of students from British Columbia receiving dietetic internships, to ensure an adequate supply of qualified dieticians.

  .3- That the number of students receiving dietetic internships be increased by 6 per year.

- **Alberta**

  .4- That the University of Alberta increase the enrolment of the Food and Nutrition Program, in the Faculty of Home Economics, by 5 places.

  .5- That the province of Alberta monitor the number of students from Alberta receiving dietetic internships to ensure an adequate supply of qualified dieticians.

  .6- That the number of students receiving dietetic internships be increased by 9 per year.

o Saskatchewan

.7- That there be no changes in the number of student enrolments in the Food and Nutrition Program at the University of Saskatchewan.

.8- That the province of Saskatchewan monitor the number of students from Saskatchewan receiving dietetic internships to ensure an adequate supply of qualified dieticians.

.9- That the number of students receiving internships be increased by 4 per year.

o Manitoba

.10- That there be no changes in the number of student enrolments in the Food and Nutrition Program at the University of Manitoba.

.11- That the province of Manitoba monitor the number of students from Manitoba receiving dietetic internships to ensure an adequate supply of qualified dieticians.

.12- That the number of students receiving internships be increased by 1 per year.

o General

.13- That all provinces monitor the inter-relationship of roles between dieticians and nutritionists to determine the future supply and net requirements of each group, and to ensure that sufficient graduates from food and nutrition programs enter dietetic internships.

APPENDIX I

STUDY APPROACH AND METHODOLOGY

STUDY APPROACH

Introduction

In order to achieve the study objectives, the work program consists of three key activities. These are:

- the analysis of manpower supply and requirements, and the calculation of net manpower requirements
- the analysis of existing training programs for Western Canada
- the development of recommendations for alternative training locations and funding arrangements

Analysis of Manpower Supply and Requirements

The analysis of manpower supply and requirements is designed to allow for a variety of data inputs, and for different emphasis depending on the occupation under review. A variety of data sources are used including provincial and national associations, health insurance agencies, and provincial health and education departments. In all instances, data is developed independently of previously published sources.

In addition to the basic projection of net manpower requirements, a number of sensitivity analyses have been completed to assess the impact of changed in the factors affecting supply and requirements, prior to developing recommendations for either additional training programs, or expanding existing training programs.

Approaches to Determining Manpower Requirements

The approach developed to determine manpower requirements uses three methods of projection. These are discussed below.

1. Service Utilization Approach

The utilization approach is based on an analysis of the pattern of health service usage. It establishes trends in service utilization and projects these onto future population estimates. There are three steps in the service utilization approach.

Step 1 - Determine Per Capita Utilization Rate

Historical data of the number of services provided, by age and sex of recipient is derived. The number of services per age/sex group is then divided by the population for group in the corresponding year. This results in a per capita utilization rate.

Step 2 - Project Future Service Required

The per capita utilization rate is projected onto the low, medium and high population for each year from 1981 to 2000. This results in an estimate of total future services.

Step 3 - Estimated Number of Practitioners Required

Having determined the total future services, the model projects the number of practitioners required, by assuming a constant level of services per practitioner. The number of services per practitioner is determined by dividing total services by the number of practitioners in the base year. To estimate the required number of practitioners, the model divides total future services required by the number of services per practitioner.

2. Service Target Ratio Approach

Service target ratios reflect a theorectical optimal manpower level required to meet health service requirements in the occupation under review. They are expressed as the ratio of practitioner to population. The service target ratios are derived based on discussion with health authorities, review of published reports, articles and summary of defined health care needs.

3. Population Ratio Approach

Population ratios are derived by dividing the total population at a specific point in time by the number of active practitioners. This results in a ratio of practitioners to population.

These ratios are analysed to determine if any trends exists. to project futuren manpower requirements, the model divides total projected population by the previously determined population ratio.

Summary of Approaches to Projecting Manpower Requirements

The three approaches outlined above have been used for the calculation of manpower requirements for this occupation. The specific application of each approach to this occupation is discussed under General Assumption, Appendix II, following.

Development of Recommendations for Alternative Training Locations and Funding Arrangements

We have developed a decision process to assist in developing recommendations for alternative training location(s) and funding arrangements. This process is designed to allow for the logical, consistent evaluation of a range of training alternatives.

There are seven steps in the decision process:

- Step 1. Analysis of manpower requirements
- Step 2. Identification of the appropriate type(s) of training
- Step 3. Definition of alternative training locations
- Step 4. Evaluation of alternative locations for new programs
- Step 5. Establishment of timing of training program requirement
- Step 6. Recommendation on training action(s) and location(s)
- Step 7. Recommendation on funding alternative(s)

LABOUR MARKET SUPPLY

Labour market supply is the relationship between the estimated number of practitioners registered with the provincial associations, the number of practitioners actually employed and the number of vacant positions. Vacancy survey data (normally collected by provincial governments) will identify the total number of budgeted positions, which is the total of the number currently employed plus vacancies.

Labour market supply is a useful tool to estimate, or determine the employment situation for each occupation. The current supply situation is expressed as total budgeted positions divided by the total number of registered practitioners. This percentage (%) of qualified practitioners who are currently employed will indicate the flexability of the existing labour market.

Typically the flexability of the labour market will reflect vacancy rates. The following table illustrates theoretical labour market situations:

"Tight" labour market - 90% - 95% of practitioners actively employed with a vacancy rate of 12% to 20%.

"Balanced" Labour Market - 80% - 90% of practitioners actively employed with a vacancy rate of 8% to 12%.

"Loose" Labour Market - 70% - 80% of practitioners actively employed with a vacancy rate of 0% to 8%.

APPENDIX II

PROVINCIAL NET MANPOWER REQUIREMENTS

Table XII.0.1

Number of Practitioners by Province in Western Canada

Occupation: DIETICIANS

Year	British Columbia[1]	Alberta[2]	Saskatchewan[3]	Manitoba[4]
1976	241	-	67	115
1977	376	196	68	123
1978	400	224	77	130
1979	-	251	83	127
1980	308	262	83	128

SOURCE:

1 DATA 1976 - 1978
DIVISION OF HEALTH SERVICES RESEARCH AND DEVELOPMENT, INFORMATION TAKEN FROM ROLL-CALL PUBLICATIONS. THE DATA FOR 1976 - 1978 INCLUDES DIFFERENT PROPORTIONS OF ACTIVE AND INACTIVE DIETICIANS.

DATA 1980
ESTIMATES BASED ON REPORT S:7, HEALTH MANPOWER RESEARCH UNIT (H.M.R.U.), DIVISION OF HEALTH SERVICES RESEARCH AND DEVELOPMENT, HEALTH SERVICES CENTRE, UNIVERSITY OF BRITISH COLUMBIA. THE DATA INCLUDES AN ESTIMATE OF ACTIVE DIETICIANS

BRITISH COLUMBIA DIETETIC ASSOCIATION (B.C.D.A.)

2 ALBERTA REGISTERED DIETETIC ASSOCIATION (A.R.A.A.). THE DATA INCLUDES AN ESTIMATE OF ACTIVE DIETICIANS.

3 SASKATCHEWAN DIETETIC ASSOCIATION (S.D.A.). THE DATA INCLUDES AN ESTIMATE OF ACTIVE DIETICIANS.

4 MANITOBA ASSOCIATION OF REGISTERED DIETICIANS (M.A.R.D.). THE DATA INCLUDES AN ESTIMATE OF ACTIVE DIETICIANS.

Table XII.0.2

Factors Affecting Manpower Supply in Western Canada

Occupation: DIETICIANS

Factor	British Columbia	Alberta
Opening Stock	308	282
Net Migration	5 for all years	8 for all years
Net Immigration	Zero for all years	Zero for all years
Net Occupation Shift	-4% of opening stock	-4% of opening stock
Training Output	18 for all years	11 for all years
Attrition	Actual Retirement	Actual Retirement

	Saskatchewan	Manitoba
Opening Stock	83	128
Net Migration	-1 for all years	-5 for all years
Net Immigration	Zero for all years	Zero for all years
Net Occupation Shift	-4% of opening stock	-4% of opening stock
Training Output	7 for all years	14 for all years
Attrition	Actual Retirement	Actual Retirement

TABLE XII.0.3

AGE STRUCTURE - DIETICIANS

BY PROVINCE

AGE GROUP	BRITISH COLUMBIA[1]	ALBERTA[1]	SASKATCHEWAN[1]	MANITOBA[1]
24 or less	83	30	8	28
25 - 29		94	22	
30 - 34	89	43	13	
35 - 39		30	7	80
40 - 44	45	26	2	
45 - 49		28	3	
50 - 54	38	26	4	40
55 - 59		16	7	
60 - 64	23	4	1	
65 & over		7	-	
UNKNOWN	5	-	-	-
TOTAL	283	304	67	148

NOTE:

1 The age distribution are taken from provincial association records and published government data. The totals include different proportions of active and inactive dieticians as determined from the association records or government reports.

GENERAL ASSUMPTIONS

Manpower Stock

Table XII.0.1, opposite, illustrates the total number of active dieticians identified in each of the provinces in Western Canada.

Factors Affecting Manpower Supply

The assumptions made with respect to each of the factors which have the potential to affect manpower stock are shown opposite in Table XII.0.2. These factors include migration, immigration, training output, active/inactive movement and retirement through attrition. For each of these assumptions, the information source has been identified. Assumptions affecting manpower have been based on historical and current information along with projected trends. The training input has been estimated on the average number of individual in each province who usually obtain dietetic internship positions.

The age distribution of dieticians is shown in Table XII.0.3. Information from the age distribution has been used to project the retirement of dieticians at the age of 65 years.

Estimating Requirements

- Historical Ratio

  For each province, the current ratio of dieticians to population was used to project the number of practitioners required in the future to maintain to current level of manpower.

- Utilization

  The utilization approach was not used to determine net manpower requirements for dieticians. The data does not reflect utilization

patterns for the complete range of services provided by dieticians. It also does not take into consideration the developing role and need for dieticians.

- Service Target Ratio

An established service target ratio for dieticians has not been determined by health care professionals. A service target ratio has been developed taking into consideration current and future population needs. The service target ratio developed indicates a reasonable ratio of 1 dietician to 7,000 people. This ratio incorporates the fact that the 1980 population ratios in the western provinces range between 7,900 to 11,600, and the requirement for dieticians is increasing because of the recognition of an expanding role in the health care system and related community areas. Factors contributing to the increased requirement include the expansion of therapeutic councelling in hospitals, the development of a dietetic role in out-patient services, the recognition of a need for dietetic services in extended care facilities along with the growing demand for individuals with a nutrition background to work in industry, public health, home care programs, education facilities and community areas.

Sensitivity Analysis

Various sensitivity analysis have been applied to the supply and requirement assumptions for dieticians. These include:

- Supply

The affect of determining supply using the number of graduates or the number of individuals receiving internships was initiated through sensitivity analysis. Because of the significant effect on manpower requirements, the most likely scenario was developed on the number of individuals obtaining internships.

- Requirements

Service target ratios of 1:10,000 and 1:6,500 were used to determine a range of requirement levels to reach for. Using a 1:10,000 service target indicates a surplus of 27 dieticians in Western Canada by the year 2000. In British Columbia a small surplus would be experienced, Alberta and Saskatchewan would have a small requirement with Manitoba having a surplus. Using the service target ratio of 1:6,500 indicates a requirement for 339 dieticians in Western Canada by the year 2000. For British Columbia and Alberta the requirement under the most likely scenario would be increased by approximately 20%, in Saskatchewan the requirement would increase by 33% and in Manitoba the requirement would double.

TABLE XII.1.1

PROVINCE: BRITISH COLUMBIA
OCCUPATION: DIETICIANS

YEAR	NUMBER OF PRACTITIONERS	POPULATION TO MANPOWER
1976	241	1: 1015
1977	376	1: 6630
1978	400	1: 6322
1979	-	-
1980	308	1: 8520

SOURCE:

DATA 1976 - 1978
DIVISION OF HEALTH SERVICES RESEARCH AND DEVELOPMENT, INFORMATION TAKEN FROM ROLL-CALL PUBLICATIONS. THE DATA FOR 1976 - 1978 INCLUDES DIFFERENT PROPORTIONS OF ACTIVE AND INACTIVE DIETICIANS.

DATA 1980
ESTIMATES BASED ON REPORT S:7, HEALTH MANPOWER RESEARCH UNIT (H.M.R.U.), DIVISION OF HEALTH SERVICES RESEARCH AND DEVELOPMENT, HEALTH SERVICES CENTRE, UNIVERSITY OF BRITISH COLUMBIA. THE DATA INCLUDES AN ESTIMATE OF ACTIVE DIETICIANS.

BRITISH COLUMBIA DIETETIC ASSOCIATION (B.C.D.A.)

Table XII.1.2

Factors Affecting Manpower Supply

Province: BRITISH COLUMBIA
Occupation: DIETICIANS

Factor	Assumption	Source
Opening Stock	308	H.M.R.U. & B.C.D.A.[2]
Net Migration	5 for all years	H.M.R.U. & B.C.D.A.
Net Immigration	Zero for all years	H.M.R.U. & B.C.D.A.
Net Occupational Shift[1]	-4% of opening stock	ESTIMATE[3]
Training Output	18 for all years	C.D.A.[4]
Attrition	Actual Retirement	H.M.R.U. & B.C.D.A.

NOTES:

1 INCLUDES ACTIVE/INACTIVE FLOWS

2 ESTIMATE BASED ON, REPORT S:7, HEALTH MANPOWER RESEARCH UNIT (H.M.R.U.), DIVISION OF HEALTH SERVICES RESEARCH AND DEVELOPMENT, HEALTH SERVICES CENTRE, UNIVERSITY OF BRITISH COLUMBIA

BRITISH COLUMBIA DIETETIC ASSOCIATION (B.C.D.A.)

3 ESTIMATE, DETERMINED FROM RESEARCH ON THE OCCUPATION

4 CANADIAN DIETETIC ASSOCIATION (C.D.A.)

TABLE XII.1.3

TOTAL NUMBER OF ACTIVE

DIETICIANS IN BRITISH COLUMBIA BY AGE

AGE GROUP	MALE	FEMALE	TOTAL
20 - 29	-	-	83
30 - 39	-	-	89
40 - 49	-	-	45
50 - 59	-	-	38
60 and over	-	-	23
Unknown	-	-	5
Total	-	-	283[1]

Source: 1. H.M.R.U., Report S:7.

2. British Columbia Dietetic Association (B.C.D.A.)

PROVINCIAL ASSUMPTIONS

BRITISH COLUMBIA

a) Legal Controls

There is currently no legislation controlling the right of dieticians to practice in British Columbia.

b) Assumptions

Table XII.1.1, opposite, indicates the total number of dieticians in British Columbia identified as active.

- **Factors Affecting Manpower Supply**

  The assumptions made with respect to each of the factors which have the potential to affect manpower supply are shown in Table XII.1.2, opposite. These factors include migration, immigration, active to inactive movements, the number of individuals receiving dietetic internships and retirement. For each assumption, the information source has been identified. The age distribution for active dieticians is shown in Table XII.1.3.

- **Confidence in Factors Affecting Manpower Supply**

  The assumptions made on manpower supply for dieticians were developed from information published in Report S:7, from the Health Manpower Research Unit (HMRU) and from estimates made by the association.

  The active stock includes the actual number of active dieticians determined by the association and an estimate of the percentage of dieticians who are active and not members of the association. The active stock includes dieticians working in traditional active treatment settings along with those in extended care, home care, out-patient facilities, public health clinics and other settings employing individuals with dietetics backgrounds.

TABLE XII.1.4

NET MANPOWER REQUIREMENTS

BRITISH COLUMBIA
OCCUPATION: DIETICIANS

YEAR	PROJECTED STOCK	PROJECTED REQUIREMENT	
		POPULATION RATIO[1]	SERVICE TARGET RATIO[2]
1981	314	314	382
		Net 0	68
1982	319	320	390
		Net 1	71
1983	324	327	398
		Net 3	74
1984	330	333	406
		Net 3	76
1985	336	340	414
		Net 4	78
1990	362	372	453
		Net 10	91
1995	385	401	488
		Net 16	103
2000	396	426	519
		Net 30	123

Note: 1- POPULATION RATIO
1:8,520

2- SERVICE TARGET RATIO
1:7,000

No records are kept on the movements from migration, immigration or from active to inactive, therefore assumptions have been developed on estimates. The active to inactive estimates are based on a movement of -4%. The training inputs are developed from the average number of individuals over the last few years who have received dietetic internships. The information is based on data collected by the Canadian Dietetic Association. Specific age distributions are not kept by the association. Estimates are made on the age distribution of dieticians presented in the Report S:7 (HMRU), and estimates from the association with retirement at the age of 65.

Estimating Requirements

o Historical Ratio

The current population ratio of 1 dietician to 8,520 population was projected over the 20 year period. This projection determines the net requirement necessary to maintain the current level of manpower.

o Service Target Ratio

The service target ratio of 1 dietician to 7,000 population, was used to determine a reasonable requirement level of dieticians to attain by the year 2000.

Net Manpower Requirements

The net manpower requirements under each projection approach are shown in Table XII.1.4, opposite. The most likely scenario is based on a service target ratio of 1:7,000 under a medium population projection.

Table XII.2.1

Province: ALBERTA
Occupation: DIETICIANS

Year	Number of Practitioners	Population to Manpower
1977	196	1: 9680
1978	224	1: 8710
1979	251	1: 8040
1980	262	1: 7950

Source: ALBERTA REGISTERED DIETETIC ASSOCIATION (A.R.D.A.)

THE DATA INCLUDES AN ESTIMATE OF ACTIVE DIETICIANS

Table XII.2.2

Factors Affecting Manpower Supply

Province: ALBERTA
Occupation: DIETICIANS

Factor	Assumption	Source
Opening Stock	262	A.R.D.A.[2]
Net Migration	8 for all years	A.R.D.A.
Net Immigration	Zero for all years	A.R.D.A.
Net Occupational Shift[1]	-4% of opening stock	ESTIMATE[3]
Training Output	11 for all years	C.D.A.[4]
Attrition	Actual Retirement	A.R.D.A.

Notes:

[1] Includes Active/Inactive Flows

[2] ALBERTA REGISTERED DIETETIC ASSOCIATION (A.R.D.A.)

[3] ESTIMATE, DETERMINED FROM RESEARCH ON THE OCCUPATION

[4] CANADIAN DIETETIC ASSOCIATION (C.D.A.)

TABLE XII.2.3

TOTAL NUMBER OF ACTIVE

DIETICIANS IN ALBERTA BY AGE

AGE GROUP	MALE	FEMALE	TOTAL
20 - 25	1	29	30
26 - 30	1	93	94
31 - 35	-	43	43
36 - 40	-	30	30
41 - 45	-	26	26
46 - 50	-	28	28
51 - 55	-	26	26
56 - 60	-	16	16
61 - 65	-	4	4
65 and over	-	-	7
Unknown	-	-	-
Total	2	302	304

Source: The Alberta Registered Dietitians Association

PROVINCIAL ASSUMPTIONS

ALBERTA

a) Legal Controls

The Registered Dieticians Act, Chapter 315, defines the limits of practice for dieticians in the province of Alberta. The certification and licensing requirements are shown in Appendix III - Scope and Control of Practice.

b) Assumptions

Table XII.2.1, opposite, indicates the total number of dieticians in Alberta identified as active.

- **Factors Affecting Manpower Supply**

  The assumptions made with respect to each of the factors which have the potential to affect manpower supply are shown in Table XII.2.2, opposite. These factors include migration, immigration, active to inactive movements, the number of individuals receiving dietetic internships and retirement. For each assumption, the information source has been identified. The age distribution for dieticians is shown in Table XII.2.3.

- **Confidence in Factors Affecting Manpower Supply**

  The assumptions made on manpower supply for dieticians were developed from estimates made by the association.

  The active stock includes the actual number of active dieticians determined by the association and an estimate of the percentage of dieticians who are active and not members of the association. The active stock includes dieticians working in traditional active treatment settings along with those in extended care, home care, out-patient facilities, public health clinics and other settings employing individuals with dietetics backgrounds.

TABLE XII.2.4

NET MANPOWER REQUIREMENTS

ALBERTA
OCCUPATION: DIETICIANS

YEAR	PROJECTED STOCK	PROJECTED REQUIREMENT	
		POPULATION RATIO[1]	SERVICE TARGET RATIO[2]
1981	267	271	308
		Net 4	41
1982	273	282	320
		Net 9	47
1983	279	293	332
		Net 14	53
1984	285	303	344
		Net 18	59
1985	292	312	354
		Net 20	62
1990	311	356	404
		Net 45	93
1995	316	398	451
		Net 82	135
2000	318	438	498
		Net 120	180

Note: 1- POPULATION RATIO
1:7,947

2- SERVICE TARGET RATIO
1:7,000

No records are kept on the movements from migration, immigration or from active to inactive, therefore assumptions have been developed on estimates. The active to inactive estimates are based on a movement of -4%. The training inputs are developed from the average number of individuals over the last few years who have received dietetic internships. The information is based on data collected by the Canadian Dietetic Association. Specific age distributions are kept by the association. Estimates are made on the age distributions projecting retirement at the age of 65.

Estimating Requirements

o Historical Ratio

The current population ratio of 1 dietician to 7,947 population was projected over the 20 year period. This projection determines the net requirement necessary to maintain the current level of manpower.

o Service Target Ratio

The service target ratio of 1 dietician to 7,000 population, was used to determine a reasonable requirement level of dieticians to attain by the year 2000.

Net Manpower Requirements

The net manpower requirements under each projection approach are shown in Table XII.2.4, opposite. The most likely scenario is based on a service target ratio of 1:7,000 under the medium population projection.

Table XII.3.1

Province: SASKATCHEWAN
Occupation: DIETICIANS

Year	Number of Practitioners	Population to Manpower
1976	67	1: 13750
1977	68	1: 13780
1978	77	1: 12310
1979	83	1: 11520
1980	83	1: 11630

Source: SASKATCHEWAN DIETETIC ASSOCIATION (S.D.A.)

THE DATA INCLUDES AN ESTIMATE OF ACTIVE DIETICIANS

Table XII.3.2

Factors Affecting Manpower Supply

Province: SASKATCHEWAN
Occupation: DIETICIANS

Factor	Assumption	Source
Opening Stock	83	S.D.A.[2]
Net Migration	-1 for all years	S.D.A.
Net Immigration	Zero for all years	S.D.A.
Net Occupational Shift[1]	-4% of opening stock	ESTIMATE[3]
Training Output	7 for all years	C.D.A.[4]
Attrition	Actual Retirement	S.D.A.

Notes:

[1] Includes Active/Inactive Flows

[2] SASKATCHEWAN DIETETIC ASSOCIATION (S.D.A.)

[3] ESTIMATE, DETERMINED FROM RESEARCH ON THE OCCUPATION

[4] CANADIAN DIETETIC ASSOCIATION (C.D.A.)

TABLE XII.3.3

TOTAL NUMBER OF ACTIVE

DIETICIANS IN SASKATCHEWAN BY AGE

AGE GROUP	MALE	FEMALE	TOTAL
20 - 24	-	-	8
25 - 29	-	-	22
30 - 34	-	-	13
35 - 39	-	-	7
40 - 44	-	-	2
45 - 49	-	-	3
50 - 54	-	-	4
55 - 59	-	-	7
60 - 64	-	-	1
65 and over	-	-	-
Unknown	-	-	-
Total	-	-	67

Source: Saskatchewan Dietetic Association

PROVINCIAL ASSUMPTIONS

SASKATCHEWAN

a) Legal Controls

The Saskatchewan Dietetic Association Act, (RSS 1965, Chapter 317) defines the limits of practice for dieticians in Saskatchewan. The certification and licensing requirements are shown in Appendix III - Scope and Control of Practice.

b) Assumptions

Table XII.3.1, opposite, indicates the total number of dieticians in Saskatchewan identified as active.

- **Factors Affecting Manpower Supply**

  The assumptions made with respect to each of the factors which have the potential to affect manpower supply are shown in Table XII.3.2, opposite. These factors include migration, immigration, active to inactive movements, the number of individuals receiving dietetic internships and retirement. For each assumption, the information source has been identified. The age distribution for active dieticians is shown in Table XII.3.3.

- **Confidence in Factors Affecting Manpower Supply**

  The assumptions made on manpower supply for dieticians were developed from estimates made by the association.

  The active stock includes the actual number of active dieticians determined by the association and an estimate of the percentage of dieticians who are active and not members of the association. The active stock includes dieticians working in traditional active treatment settings along with those in extended care, home care, out-patient facilities, public health clinics and other settings employing individuals with dietetics backgrounds.

TABLE XII.3.4

NET MANPOWER REQUIREMENTS

SASKATCHEWAN
OCCUPATION: DIETICIANS

YEAR	PROJECTED STOCK	PROJECTED REQUIREMENT	
		POPULATION RATIO[1]	SERVICE TARGET RATIO[2]
1981	86	84	140
		Net -2	54
1982	89	85	142
		Net -4	53
1983	91	87	144
		Net -4	53
1984	93	88	146
		Net -5	53
1985	95	89	148
		Net -6	53
1990	101	95	158
		Net -6	57
1995	104	101	167
		Net -3	63
2000	109	106	175
		Net -3	66

Note: 1- POPULATION RATIO
1:11,625

2- SERVICE TARGET RATIO
1:7,000

No records are kept on the movements from migration, immigration or from active to inactive, therefore assumptions have been developed on estimates. The active to inactive estimates are based on a movement of -4%. The training inputs are developed from the average number of individuals over the last few years who have received dietetic internships. The information is based on data collected by the Canadian Dietetic Association. Specific age distributions are kept by the association. Estimates for retirement are based on these age distributions and retirement at the age of 65.

Estimating Requirements

o Historical Ratio

The current population ratio of 1 dietician to 11,675 population was projected over the 20 year period. This projection determines the net requirement necessary to maintain the current level of manpower.

o Service Target Ratio

The service target ratio of 1 dietician to 7,000 population, was used to determine a reasonable requirement level of dieticians to attain by the year 2000.

Net Manpower Requirements

The net manpower requirements under each projection approach are shown in Table XII.3.4, opposite. The most likely scenario is based on a service target ratio of 1:7,000 under the medium population projection.

TABLE XII.4.1

PROVINCE: MANITOBA
OCCUPATION: DIETICIANS

YEAR	NUMBER OF PRACTITIONERS	POPULATION TO MANPOWER RATIO
1976	115	1:8.8826
1977	123	1:8.3667
1978	130	1:7.9454
1979	127	1:8.2394
1980	128	1:8.2375

SOURCE:

MANITOBA ASSOCIATION OF REGISTERED DIETICIANS (M.A.R.D.). THE DATA INCLUDES THE ESTIMATED NUMBER OF ACTIVE DIETICIANS.

Table XII.4.2

Factors Affecting Manpower Supply

Province: MANITOBA
Occupation: DIETICIANS

Factor	Assumption	Source
Opening Stock	128	M.A.R.D.[2]
Net Migration	-5 for all years	M.A.R.D.
Net Immigration	Zero for all years	M.A.R.D.
Net Occupational Shift[1]	-4% of opening stock	ESTIMATE[3]
Training Output	14 for all years	C.D.A.[4]
Attrition	Actual Retirement	M.A.R.D.

Notes:

[1] Includes Active/Inactive Flows

[2] MANITOBA ASSOCIATION OF REGISTERED DIETICIANS (M.A.R.D.)

[3] ESTIMATE, DETERMINED FROM RESEARCH ON THE OCCUPATION.

[4] CANADIAN DIETETIC ASSOCIATION (C.D.A.)

TABLE XII.4.3

TOTAL NUMBER OF ACTIVE

DIETICIANS IN MANITOBA BY AGE

AGE GROUP	MALE	FEMALE	TOTAL
Less than 30	-	28	28
31 - 45	-	80	80
45 and over	-	40	40
Unknown	-	-	-
Total	-	148	148

Source: Manitoba Association of Registered Dieticians.

PROVINCIAL ASSUMPTIONS

MANITOBA

a) Legal Controls

There is currently no legislation controlling the right of dieticians to practice in Manitoba.

b) Assumptions

Table XII.4.1, opposite, indicates the total number of dieticians in Manitoba identified as active.

- **Factors Affecting Manpower Supply**

  The assumptions made with respect to each of the factors which have the potential to affect manpower supply are shown in Table XII.4.2, opposite. These factors include migration, immigration, active to inactive movements, the number of individuals receiving dietetic internships and retirement. For each assumption, the information source has been identified. The age distribution for active dieticians is shown in Table XII.4.3.

- **Confidence in Factors Affecting Manpower Supply**

  The assumptions made on manpower supply for dieticians were developed from estimates made by the association.

  The active stock includes the actual number of active dieticians determined by the association and an estimate of the percentage of dieticians who are active and not members of the association. The active stock includes dieticians working in traditional active treatment settings along with those in extended care, home care, out-patient facilities, public health clinics and other settings employing individuals with dietetics backgrounds.

TABLE XII.4.4

NET MANPOWER REQUIREMENTS

MANITOBA
OCCUPATION: DIETICIANS

YEAR	PROJECTED STOCK	PROJECTED REQUIREMENT	
		POPULATION RATIO[1]	SERVICE TARGET RATIO[2]
1981	130	129	152
		Net -1	22
1982	132	130	153
		Net -2	21
1983	134	130	154
		Net -4	20
1984	136	131	155
		Net -5	19
1985	138	132	156
		Net -6	18
1990	144	137	161
		Net -7	17
1995	149	140	165
		Net -9	16
2000	154	143	169
		Net -11	15

Note: 1- POPULATION RATIO
1:8,240

2- SERVICE TARGET RATIO
1:7,000

No records are kept on the movements from migration, immigration or from active to inactive, therefore assumptions have been developed on estimates. The active to inactive estimates are based on a movement of -4%. The training inputs are developed from the average number of individuals over the last few years who have received dietetic internships. The information is based on data collected by the Canadian Dietetic Association. Specific age distributions are not kept by the association. Estimates have been made and projections have been developed for retirement at the age of 65.

Estimating Requirements

o Historical Ratio

The current population ratio of 1 dietician to 8,240 population was projected over the 20 year period. This projection determines the net requirement necessary to maintain the current level of manpower.

o Service Target Ratio

The service target ratio of 1 dietician to 7,000 population, was used to determine a reasonable requirement level of dieticians to attain by the year 2000.

Net Manpower Requirements

The net manpower requirements under each projection approach are shown in Table XII.4.4, opposite. The most likely scenario is based on a service target ratio of 1:7,000 under the medium population projection.

APPENDIX III - SCOPE OF PRACTICE

DIETICIANS: CONTROL OF PRACTICE

PROVINCE	CERTIFICATION/LICENSING/REGISTRATION		
	REQUIRED CHARACTERISTICS OF APPLICANTS	CERTIFICATION REQUIREMENTS	LICENSING REQUIREMENTS
Alberta Chapter 35			<u>Alberta Registered Dieticians Act.</u> Membership available to following persons: . a graduate in household economics with a major in foods and nutrition, of a university under The Universities Act, or produces a certificate from the Co-ordinating Council pursuant to Section 13, or is a member in good standing of the Canadian Dietetic Association; or . proves completion of a dietetic internship approved by the Co-ordinating Council; or . have three years' diversified experience in the study or practice of nutrition or dietetics or allied subjects; or . have two years' experience in teaching including teaching in a course in foods or nutrition or institution administration as a full-time member of a university or college staff; or . have a master's degree in the study of foods or nutrition or institution administration and one year's experience in the study or practice of nutrition or dietetics or allied subjects.

DIETICIANS: CONTROL OF PRACTICE

PROVINCE	CERTIFICATION/LICENSING/REGISTRATION		
	REQUIRED CHARACTERISTICS OF APPLICANTS	CERTIFICATION REQUIREMENTS	LICENSING REQUIREMENTS
Saskatchewan R.S.S. Chapter P-28			The Professional Dieticians Act. Membership available to following persons: . members of Canadian Dietetic Association; or . members in out of province or out of country organizations empowered to register or receive as members qualified dieticians, if the University of Saskatchewan are satisfied with the standards of the organization; or . graduates of a school or college approved by the board of directors and the University of Saskatchewan, and who pass the prescribed exams; or . in the discretion of the board any person who can furnish evidence of qualifications and moral character satisfactory to the board of directors.

APPENDIX IV - BIBLIOGRAPHY

ARTICLES AND PAPERS

Alberta Registered Dieticians Association, Prepared for Presentation to the Department of Hospitals and Medical Care, Government of the Province of Alberta. Position paper on Dieticians Services in Alberta Hospitals and Nursing Homes, September 1980.

Canadian Dietetic Association

Number of Students Applying and Number Accepted According to Province, 1980.

Summary of University Student Applications for Internship within Region, March 1981.

Summary of Internship Appointments within a Region, March 1981.

Internships Available with Number of Candidates by Province, 1980.

Summary of Internship Applications and Appointments According to Place of Internship and Region, 1980.

Hunt, E.G., "Rhode Island Builds a Career Ladder in Dietetics" Journal of the American Dietetic Association, (71:635-8), December 1977.

REPORTS

Division of Health Services Research and Development, University of British Columbia, Study of Dietetic Personnel in British Columbia, Research Results of Dietetic Manpower Pilot Project for the Canadian Dietetic Association, 1978-1979, Report S:7, June 12, 1980.

PROVINCIAL HEALTH MANPOWER REFERENCE SOURCES

BRITISH COLUMBIA

- Rollcall 79 — A Status Report of Health Personnel in the Province of British Columbia.
  Report R:12
  Division of Health Services Research and Development
  Health Sciences Centre,
  University of British Columbia.

- Rollcall Update 80 — A Status Report of Selected Health Personnel in the Province of British Columbia.
  Report R:16
  Division of Health Services Research and Development
  Health Sciences Centre,
  University of British Columbia.

ALBERTA

Health and Social Service Manpower in Alberta 1980

Alberta - Health and Social Services
Disciplines Committee.

SASKATCHEWAN

Annual Report 1978 - Saskatchewan Health Manpower

Saskatchewan Health.

MANITOBA

Health Manpower Provincial Report - Manitoba 1980.

Manitoba - Department of Health
Research Section.

Number/
Numéro

4

Province of
British Columbia

Province of
Alberta

Province of
Saskatchewan

Province of
Manitoba

WESTERN CANADA
HEALTH MANPOWER TRAINING STUDY

SECTION III - CATEGORY 3 REPORTS (PART II)

- HEALTH RECORDS
- MEDICAL LABORATORY TECHNOLOGISTS
- OCCUPATIONAL THERAPISTS
- PHARMACISTS
- PHYSIOTHERAPY
- X-RAY TECHNICIANS
- RESPIRATORY TECHNOLOGISTS

Province of
British Columbia

Province of
Alberta

Province of
Saskatchewan

Province of
Manitoba

WESTERN CANADA
HEALTH MANPOWER TRAINING STUDY

Category # 3 Report XIII
HEALTH RECORDS

- Health Records Administrators
- Health Records Technicians

REPORT XIII

HEALTH RECORDS

THE REQUIREMENT FOR ALTERNATIVE TRAINING AND FUNDING ARRANGEMENTS IN WESTERN CANADA

REPORT XIII

HEALTH RECORDS OCCUPATIONS

TABLE OF CONTENTS

PAGE

I. INTRODUCTION

- Study Background..... 1
- Study Objectives..... 1
- Study Approach..... 2
- Occupation Definition..... 4

II. TRAINING NEEDS IN WESTERN CANADA

- Manpower Requirements..... 5
- Existing Training Programs..... 6
- Occupational Issues..... 8

III. TRAINING RESPONSES

- Decision Process.....11
- Timing and Location of Manpower Requirement.....11
- Indicated Manpower Responses.....12
- Defined Alternative Locations.....13

IV. RECOMMENDATIONS.....16

APPENDIX I - Study Approach and Methodology

APPENDIX II - Provincial Net Manpower Requirement

APPENDIX III - Scope of Practice

APPENDIX IV - Bibliography

I. INTRODUCTION

STUDY BACKGROUND

The provision of effective health services to the community is, to a considerable degree, dependent on three essential resources:

- an adequate supply of well trained specialist staff in each health occupation group
- the development of adequate facilities to service the community
- the availability of adequate funds to ensure cost-effective and efficient health services.

The range and complexity of health treatment programs has expanded greatly in Canada during the last twenty-five years. In addition, changing technology and the development of new treatment programs have resulted in an increased requirement for skilled, adequately trained health manpower. These factors have resulted in an increased emphasis on manpower planning and skill training for health occupations to ensure an adequate supply of trained practitioners to meet defined manpower requirements.

STUDY OBJECTIVES

The Western Canada Health Manpower Training Study was initiated by the western Premiers at their annual conference in 1980. The study terms of reference contain two major objectives. These are:

- to assess the existing and future needs for health manpower training programs and facilities in western Canada

- to make recommendations for the rationalization of the location and funding of health manpower training programs and facilities in western Canada.

STUDY APPROACH

The study was under the direction of a Steering Committee consisting of health and education representatives from the Provinces of British Columbia, Alberta, Saskatchewan and Manitoba. The study took place over two years and consisted of a review of 26 health occupations grouped into five categories. Each occupation has been studied separately, and a report has been produced for each. In addition, a report examining the inter-relations of the occupations has been submitted to the Steering Committee.

Data was collected from provincial and national associations and from government agencies for each of the occupations on the numbers of individuals registered with the associations and their current status as active or inactive practitioners. An attempt was also made to gather data on historical trends, the number of graduates from training, trends in movement of active practitioners to inactive status, occupational shifts out of the profession, trends in migration to and from other provinces, and immigration and emigration.

In the cases where validated and reliable information was not available, association spokesmen, employers and individuals in each of the occupations were interviewed to provide qualitative opinions regarding present and future trends affecting the manpower supply and requirement.

A literature review was conducted to examine the problems facing the occupation. A bibliography of the material reviewed is contained in Appendix IV.

A health manpower computer model was developed to assist in the preparation of projections on the future supply and requirement for each occupation. A critical analysis of these twenty-year projections was then undertaken to develop the various supply and requirement scenarios presented in this report.

Separate documents describing the manpower planning methodology and the training decision-making process were issued. A brief summary of the overall study approach and methodology is set out in Appendix I and details of the provincial net requirements are set out in Appendix II.

OCCUPATION DEFINITION

This report addresses the need for training programs for health records administrators and technicians in each of the four provinces.

The report is concerned with two levels of health records personnel -- health records administrators (formerly called medical records librarians) and health records technicians.

For the purpose of this study, a health records administrator is an individuals who:

"compiles and maintains medical records and statistics of hospital and clinic patients. Reviews clinical records for completeness and contacts medical personnel to obtain missing data. Codes, indexes and files records of diagnoses, diseases and treatments. Compiles statistics; such as, reports on admissions, births, deaths, transfers and discharges. Releases medical information to staff and authorized government agencies, insurance companies, physicians, hospitals and medical information and research centres. May brief and transcribe records. May testify in court to authenticate medical records."[1]

A health records technician is an individual who:

"assists Health Record Administrators, carry out many technical activities within the medical record department, typing medical information, preparing statistical reports, reviewing medical records, supervising clerical personnel, working with doctors, nurses and other health professionals on medical research projects."[2]

In a larger health records department, the administrator will be the supervisor of technicians and other support staff.

An emerging category of health records personnel is the health information science specialists discussed under the section "Existing Training Programs". However, it is beyond the mandate of this study to review this group in detail.

1. Canadian Classification and Dictionary of Occupations, No. 4161, 1980 Revision.

2. Health Manpower Provincial Report, Manitoba, 1978.

EXHIBIT 1

MANPOWER REQUIREMENTS

WESTERN CANADA, HEALTH RECORDS

(BASED ON MOST LIKELY SCENARIO FROM EACH PROVINCE)

YEAR	PROJECTED STOCK	PROJECTED REQUIREMENT
1981	1,012	1,023
	NET	11
1982	1,026	1,050
	NET	24
1983	1,040	1,080
	NET	40
1984	1,055	1,107
	NET	52
1985	1,069	1,133
	NET	64
1990	1,123	1,245
	NET	122
1995	1,166	1,352
	NET	186
2000	1,203	1,465
	NET	262

II - TRAINING NEEDS IN WESTERN CANADA

This section presents the statistical data for manpower requirements for western Canada, reviews the basis for projection, and the confidence in basic data, outlines existing training programs for health records personnel, and discusses the major issues influencing the occupation.

MANPOWER REQUIREMENTS

Exhibit 1, opposite, shows the projected stock and requirement for health records personnel during the period 1981 - 2000. These projections are based on the most likely scenario derived for each province, and show an average annual requirement of approximately 15 additional health records personnel throughout the forecast period. However, these numbers reflect the personnel required to maintain the medical records of a population that is increasing and does not discriminate between "Technician" and "Clerk". This situation is discussed in more detail in "Occupational Issues".

Methodology

For each province, the most likely scenario has been based on the medium population projection, and the service utilization approach based on the pattern of patient discharges by age and sex, for each of the four western provinces, derived from Statistics Canada. The manpower requirement data has been divided into the administrator and technician groups as shown in Appendix II so that separate training recommendations could be developed for each occupation.

TABLE I

EXISTING TRAINING PROGRAMS - WESTERN CANADA

HEALTH RECORDS

o	British Columbia:	- program for administrators graduating 13 in 1981 - no program for technicians
o	Alberta:	- program for administrators graduating 14 in 1981 - 1 program for technicians graduating 10 in 1981
o	Saskatchewan:	- 1 combined technician/administrator program graduating 8 administrators and 6 technicians in 1981
o	Manitoba:	- no program for administrators - 1 program for technicians graduating 24 in 1981

There was no identified service target ratio for these occupations.

The approaches used to determine manpower requirements are discussed in Appendix I.

Degree of Confidence in Data

Projections of manpower supply have been prepared based on current manpower stock, net migration, net immigration, occupational shift including active/inactive movements, training outputs and attrition. Since registration in the provincial or national associations is not mandatory for employment, the data could be underestimated in all factors. The provincial associations estimated the number of practitioners who registered with their association, and the data was adjusted to include all active health records personnel in the province. This produced a more accurate manpower stock number, but the result emphasized the fact that there are many more qualified health records personnel than budgeted health records positions.

Since the associations have no separate information on the movement of administrators and technicians, the manpower data had to be estimated for each group, as discussed in Appendix II. The level of accuracy of this data is not high, but it is within an acceptable range.

EXISTING TRAINING PROGRAMS

The existing training programs for health records personnel are shown in Table I, opposite.

A more detailed discussion of these training programs are in Report 3-A, "The Scope of Existing Training Programs Category III Occupations".

Correspondence Course

In addition to these programs, a correspondence course for health records technicians is available through the Canadian College of Health Record Administrators (C.C.H.R.A.) and in recent years each province has averaged the following number of graduates:

- British Columbia: 18 technicians
- Alberta: 12 technicians
- Saskatchewan: 6 technicians
- Manitoba: 6 technicians

Health Information Science Program - University of Victoria

The University of Victoria in British Columbia has developed a four-year baccalaureate degree program in health information science. Although the program has not yet admitted the first students, the university anticipates graduating approximately 24 students by 1986. These graduates will be qualified to design, implement and supervise electronic-data-base patient information systems. It is anticipated that they will assume senior level positions within hospitals, government, and private industry, and may also work in a consulting capacity. These individuals will be specialists in health information processing technology, and will not replace health records administrators whose primary responsibility is for the compilation and maintenance of health records data on a daily basis.

OCCUPATIONAL ISSUES

Several trends will affect the health records profession in the forecast period. These are:

- Overqualification

  There is potential interchangeability of health records technicians and clerical personnel. Although a medical records department requires a certain number of personnel to be effective, hospitals have found that clerks are just as capable as technicians in performing data entry tasks. It appears that often technicians are overqualified for their particular jobs, with the result that trained technicians are filling clerical positions and clerks are performing technician activities.

- Utilization of Trained Health Records Personnel

  Some employers feel that the training programs for administrators are primarily health record related and are not management skills oriented. There is a trend to hire business graduates into management/ administrator positions. As a result, in many instances, administrators are used more as technicians and do not take a management role. As previously discussed, technicians are often not fully utilized either, as often medical records departments designate positions as clerical, yet the duties are more that of a technician.

- Re-Entry to Workforce

  Health records is an "easy-to-return-to" job. The majority of health records personnel do not work shifts and their job duties are such that it is easy for those who wish to return to the occupation to do so. The current stock principally consists of young females, and the

anticipated attrition rate is relatively low during the forecast period. A high proportion of health records personnel return to the work force on completion of maternity leave, thus lengthening the average working life within the occupation.

o Trend to Computerization of Patient Records

The health records industry will have access to many of the same information processing techniques which are currently being developed in other sectors of the economy. The need for current, timely information, the requirement for access to basic patient records, and the need to audit record keeping will result in increased utilization of electronic data processing equipment. Historically, the training for health record administrators and health records technicians has placed little emphasis on computer technology. Recent curriculum changes have resulted on a greater emphasis on data processing in training programs for these occupations.

Given the increased technological sophistication of information processing and trends in electronic data processing, it is apparent that increased awareness and skills must be developed in health information personnel. This requirement has been recognized in the development of the Health Information Sciences program at the University of Victoria.

This trend to increased use of electronic data processing equipment may decrease the requirement for technicians in the future, as data will be entered and accessed more quickly, thus enabling fewer technicians to handle more records. The trend will also change the nature of technicians work from the preparation of records and analysis/statistical report preparation to an increased emphasis of data input activities.

- **Female Practitioners**

It is estimated that approximately 98% of health records personnel in western Canada are female. Data is not available on the number of males entering training, and consequently no attempt has been made to estimate the future composition of the workforce.

- **Pattern of Employment**

Based on survey data from the provinces of Alberta and Saskatchewan it is estimated that approximately 85% of health records personnel work full-time.

There is no information available on the number of hours worked by part-time employees, and consequently no attempt has been made to calculate full-time equivalent practitioners.

EXHIBIT 2

OCCUPATION: HEALTH RECORDS

NET MANPOWER REQUIREMENTS
MOST LIKELY SCENARIO

YEAR	BRITISH COLUMBIA		ALBERTA		SASKATCHEWAN		MANITOBA		REGION	
	Stock	Req.	Stock	Req.	Stock	Req.	Stock	Req.	Stock	Req.
1981	227	234	460	478	147	145	178	166	1012	1023
NET		7		18		-2		-12		11
1982	225	238	459	497	151	148	191	167	1026	1050
NET		13		38		-3		-24		24
1983	223	244	458	517	155	150	204	169	1040	1080
NET		21		59		-5		-35		40
1984	222	249	458	535	159	153	216	170	1055	1107
NET		27		77		-6		-46		52
1985	221	255	458	551	163	155	227	172	1069	1133
NET		34		93		-8		-55		64
1990	215	280	458	622	177	165	273	178	1123	1245
NET		65		164		-12		-95		122
1995	215	306	458	690	186	173	307	183	1166	1352
NET		91		232		-13		-124		186
2000	220	328	458	767	193	182	332	188	1203	1465
NET		108		309		-11		-144		262

III - TRAINING RESPONSES

DECISION PROCESS

The decision process, outlined in Appendix I and discussed in detail in Report C, "A Decision Process To Evaluate the Location of, and Funding Arrangements for Health Occupation Training Programs in Western Canada", was used to evaluate the training implications of the net manpower requirements for health records personnel discussed above. This section contains the results of this analysis.

TIMING AND LOCATION OF MANPOWER REQUIREMENT

Exhibit 2, opposite, shows the projected manpower requirement under the most likely scenario for the period 1981 - 2000 for each of the provinces. As the exhibit indicates, British Columbia and Saskatchewan have a balanced situation, Alberta has a small requirement and Manitoba has a small surplus of health records personnel. Appendix II shows how the health records occupation has been separated into the two groups of administrators and technicians for the purpose of calculating the net manpower requirements. Specific discussion of the net manpower requirement for each province follows:

- British Columbia has a balanced situation overall. An examination of the two groups shows that a requirement for 10 technicians per year during the forecast period is offset by a surplus of 4 administrators per year.

- Alberta has a requirement for 15 additional health records personnel each year during the forecast period. An examination of the two groups shows that there is a requirement for technicians, and that administrators are in a balance situation.

- Saskatchewan - has a balanced situation overall. An examination of the two groups shows that the requirement for technicians of 2 per year is offset by the same surplus of administrators.

- Manitoba - has a surplus of 8 personnel per year during the forecast period. An examination of the two groups shows that there is a surplus of technicians whereas administrators are in a balance situation.

In addition to the information obtained from the professional association on active registered stock, data from the 1981 vacancy survey in the province of Alberta has been used to determine the surplus, or requirement for medical records personnel in Alberta. The survey indicates that there were 308 budgeted positions in the province. The association indicated that approximately 67% of active registered members of the association were employed, and that there is a large pool of practitioners available. For a further discussion of Labour Market Supply refer to Appendix I. This large inactive pool is consistent with the indicated low vacancy rate of 3.0%.

The training recommendations for the province of Alberta have been developed on the assumption that the province will wish to maintain this relationship between labour market supply and the number employed, and train the required number of practitioners to maintain this current balance.

INDICATED MANPOWER RESPONSES

The statistical results show that there are many more qualified health records personnel than budgeted health records positions. The preceding discussion indicates the need for basic training only. There are basic training programs for health records personnel in each of the western provinces. Expanding existing enrolment can be used to train additional practitioners, and reducing enrolment or eliminating a training program can

reduce a surplus of practitioners. In western Canada, these methods can be utilized to produce a more balanced situation for health records administrators and technicians. The basic training program also can be delivered by correspondence as is currently the case for technicians through the C.C.H.R.A. This facilitates the education of health records personnel in rural areas.

DEFINED ALTERNATIVE LOCATIONS

On average, there is a slight surplus of health records administrators in western Canada. This indicates that the number of training programs could be reduced from 3 to 2, with only British Columbia and Alberta, where the manpower requirements are greater, providing basic training programs. If Manitoba or Saskatchewan experience a requirement for administrators in the future, they could contract places in either the British Columbia or Alberta program. The current program in Saskatchewan has a small output of administrators and the province has the potential for a minimal surplus situation. Phasing out the training program in Saskatchewan could result in cost savings.

The data shows a requirement for technicians in all provinces except Manitoba. However, given the interchangeability of technicians and clerks, the latter could balance any requirement. Additionally, the C.C.H.R.A. correspondence course graduates sufficient numbers of technicians to cover any manpower requirement. Therefore, there is no necessity to continue training technicians in institutions in western Canada. If a need does arise, the basic training program could be coupled with an existing administrator training program. If necessary, a new program could be established with relative ease as the occupation does not require technological equipment.

The University of Victoria program for health information science personnel is the only one of its kind in Canada. The larger hospitals, government and industry may have a limited requirement for these specialists on staff. There will be an initial demand for these specialists, but not a continued major requirement from any one province. The program should continue at its proposed location, and it is anticipated that the one program will have sufficient capacity to meet the projected requirements for the Western Canada Region.

Review of Funding Arrangements

Funding arrangements should be developed for the two regional training programs. These are:

- basic training for administrators - given the premise that the existing programs in British Columbia and Alberta could satisfy the manpower requirement for administrators in western Canada, the provinces of Saskatchewan and Manitoba should enter into bilateral training agreements with the Governments of British Columbia and Alberta as the need arises. When it is necessary to contract for training places, the provinces should share in the ongoing operational and administrative overhead costs of the program based on the proportion of training places for which each province contracts. Program development, start-up and capital costs would be excluded from these training agreements on the basis that a program already exists.

- basic training for health information science personnel - assuming that the western provinces, other than British Columbia, will want access to these specialists, they should enter bilateral training agreements with the Government of British Columbia. Specifically, Alberta should contract 3 places annually, whereas Saskatchewan and Manitoba should contract 1 place annually. Each province should share in the ongoing

operational and administrative overhead costs of the program based on the proportion of training places for which each contracts. Program development, start-up and capital costs should also be shared on a proportional basis, as the program has only recently been designed.

Defined Length of Training Agreements

For the training program for administrators, the formal training agreements between the provinces of Saskatchewan and Manitoba with the provinces of British Columbia and Alberta should be for five year periods. They should not commence until there is a proven manpower requirement, which should not occur during the initial five year period from 1981 - 1986.

For the training program for health information science personnel, the formal training agreements between the Governments of Alberta, Saskatchewan and Manitoba with the Government of British Columbia should initially be of five years duration, with subsequent renewal options for additional five year periods.

IV - RECOMMENDATIONS

Recommendations for each of the four provinces, and for the western Canada region are set out below.

- British Columbia

.1- That British Columbia's proposed training program for technicians not be established.

.2- That British Columbia maintain the current enrolment in the training program for administrators.

.3- That British Columbia cancel the newly developed program which upgrades technicians to administrators.

- Alberta

.4- That Alberta maintain the current enrolment in the training program for administrators.

- Saskatchewan

.5- That Saskatchewan phase out the training program for administrators over the next 5 years, and during that time assess the impact of a reduced program and make adjustments accordingly.

- Manitoba

.6- That Manitoba not develop a training program for administrators.

General Recommendations

.7- That Saskatchewan and Manitoba contract places in the administrator training program in British Columbia or Alberta as the need arises.

.8- That the University of Victoria be designated the western Canada school responsible for training health information science personnel.

.9- That the current training programs for technicians in Alberta, Saskatchewan and Manitoba be phased out over the next five years.

.10- That Alberta contract 3 places annually, Saskatchewan and Manitoba 1 place annually in the University of Victoria program.

.11- That formal bilateral training agreements for the university program be negotiated between British Columbia and the other western provinces for an initial period of five years duration, with subsequent renewal options for additional five year periods.

.12- That all ongoing operational and administrative overhead costs, and all program development, start up and capital costs of the proposed University of Victoria Health Information Science program should be shared by the Governments of British Columbia, Alberta, Saskatchewan and Manitoba on the basis of the proportion of places allocated to that province in the training program.

APPENDIX I

STUDY APPROACH AND METHODOLOGY

STUDY APPROACH

Introduction

In order to achieve the study objectives, the work program consists of three key activities. These are:

- the analysis of manpower supply and requirements, and the calculation of net manpower requirements
- the analysis of existing training programs for Western Canada
- the development of recommendations for alternative training locations and funding arrangements

Analysis of Manpower Supply and Requirements

The analysis of manpower supply and requirements is designed to allow for a variety of data inputs, and for different emphasis depending on the occupation under review. A variety of data sources are used including provincial and national associations, health insurance agencies, and provincial health and education departments. In all instances, data is developed independently of previously published sources.

In addition to the basic projection of net manpower requirements, a number of sensitivity analyses have been completed to assess the impact of changed in the factors affecting supply and requirements, prior to developing recommendations for either additional training programs, or expanding existing training programs.

Approaches to Determining Manpower Requirements

The approach developed to determine manpower requirements uses three methods of projection. These are discussed below.

1. Service Utilization Approach

The utilization approach is based on an analysis of the pattern of health service usage. It establishes trends in service utilization and projects these onto future population estimates. There are three steps in the service utilization approach.

Step 1 - Determine Per Capita Utilization Rate

Historical data of the number of services provided, by age and sex of recipient is derived. The number of services per age/sex group is then divided by the population for group in the corresponding year. This results in a per capita utilization rate.

Step 2 - Project Future Service Required

The per capita utilization rate is projected onto the low, medium and high population for each year from 1981 to 2000. This results in an estimate of total future services.

Step 3 - Estimated Number of Practitioners Required

Having determined the total future services, the model projects the number of practitioners required, by assuming a constant level of services per practitioner. The number of services per practitioner is determined by dividing total services by the number of practitioners in the base year. To estimate the required number of practitioners, the model divides total future services required by the number of services per practitioner.

2. Service Target Ratio Approach

Service target ratios reflect a theorectical optimal manpower level required to meet health service requirements in the occupation under review. They are expressed as the ratio of practitioner to population. The service target ratios are derived based on discussion with health authorities, review of published reports, articles and summary of defined health care needs.

3. Population Ratio Approach

Population ratios are derived by dividing the total population at a specific point in time by the number of active practitioners. This results in a ratio of practitioners to population.

These ratios are analysed to determine if any trends exists. to project futuren manpower requirements, the model divides total projected population by the previously determined population ratio.

Summary of Approaches to Projecting Manpower Requirements

The three approaches outlined above have been used for the calculation of manpower requirements for this occupation. The specific application of each approach to this occupation is discussed under General Assumption, Appendix II, following.

Development of Recommendations for Alternative Training Locations and Funding Arrangements

We have developed a decision process to assist in developing recommendations for alternative training location(s) and funding arrangements. This process is designed to allow for the logical, consistent evaluation of a range of training alternatives.

There are seven steps in the decision process:

. Step 1. Analysis of manpower requirements

. Step 2. Identification of the appropriate type(s) of training

. Step 3. Definition of alternative training locations

. Step 4. Evaluation of alternative locations for new programs

. Step 5. Establishment of timing of training program requirement

. Step 6. Recommendation on training action(s) and location(s)

. Step 7. Recommendation on funding alternative(s)

LABOUR MARKET SUPPLY

Labour market supply is the relationship between the estimated number of practitioners registered with the provincial associations, the number of practitioners actually employed and the number of vacant positions. Vacancy survey data (normally collected by provincial governments) will identify the total number of budgeted positions, which is the total of the number currently employed plus vacancies.

Labour market supply is a useful tool to estimate, or determine the employment situation for each occupation. The current supply situation is expressed as total budgeted positions divided by the total number of registered practitioners. This percentage (%) of qualified practitioners who are currently employed will indicate the flexability of the existing labour market.

Typically the flexability of the labour market will reflect vacancy rates. The following table illustrates theoretical labour market situations:

"Tight" labour market - 90% - 95% of practitioners actively employed with a vacancy rate of 12% to 20%.

"Balanced" Labour Market - 80% - 90% of practitioners actively employed with a vacancy rate of 8% to 12%.

"Loose" Labour Market - 70% - 80% of practitioners actively employed with a vacancy rate of 0% to 8%.

APPENDIX II

PROVINCIAL NET MANPOWER REQUIREMENTS

Table XIII.0.1

Number of Practitioners by Province in Western Canada

Occupation: HEALTH RECORDS

Year	British Columbia[1]	Alberta[2]	Saskatchewan[3]	Manitoba[4]
1976	-	-	150	121[5]
1977	176	374	156	146[5]
1978	205	458	150	161[5]
1979	218	446	143	158[5]
1980	229	461	143	164[4]

Notes:

1 SOURCE: BRITISH COLUMBIA RECORD ASSOCIATION

2 SOURCE: ALBERTA HEALTH RECORDS ASSOCIATION

3 SOURCE: SASKATCHEWAN HEALTH RECORDS ASSOCIATION

4 SOURCE: MANITOBA HEALTH RECORDS ASSOCIATION

5 SOURCE: HEALTH MANPOWER PROVINCIAL REPORT, MANITOBA - 1980

Table XIII.0.2

Factors Affecting Manpower Supply in Western Canada

Occupation: HEALTH RECORDS

Factor	British Columbia	Alberta
Opening Stock	229	461
Net Migration	1 for all years	4 for all years
Net Immigration	1 for all years	Zero for all years
Net Occupation Shift	-6% of opening stock	-6% of stock
Training Output	13 for all years	24 for all years
Attrition	3 for 1981-1989 4 for 1990 2 for 1991-1995 1 for 1996-2000	1 for all years

	Saskatchewan	Manitoba
Opening Stock	143	164
Net Migration	0 for 2 years 1 every third year	1 for all years
Net Immigration	0 for 2 years -1 every third year	Zero for all years
Net Occupation Shift	-6% of stock	-6% of stock
Training Output	14 for all years	24 for all years
Attrition	Actual Retirement	1 for all years

GENERAL ASSUMPTIONS

Manpower Stock

Table XIII.0.1, opposite, shows the approximate number of health records personnel (administrators and technicians) in western Canada. It indicates those practitioners who are active in their respective provinces as identified by the sources noted at the bottom of the table.

Factors Affecting Manpower Supply

The assumptions made with respect to each of the factors which have the potential to affect manpower stock are shown opposite in Table XIII.0.2. These factors include migration, immigration, occuaptional shift, trianing output, and attrition. The age distribution of practitioners, where available, is shown in Table XIII.0.3. It should be noted that stock has been based on the provincial association estimates of the number of members are who actively registered. For specific discussion refer to provincial assumptions. As a result of these estimates the stock figure will not equate with previously published manpower data.

Estimating Requirements

- Historical Ratio

  For each province, the current ratio of health records personnel to population was used to project the number of personnel required in the future to maintain the current level of manpower.

- Utilization Method

  Each province has data on the number of patient discharges by age and sex, thus making manpower projections based on utilization more accurate than those based on the historical ratio.

TABLE XIII.0.3

AGE STRUCTURE OF HEALTH RECORDS PERSONNEL

BY PROVINCE AND REGION

AGE GROUP	B.C.	ALBERTA	SASK.	MANITOBA	TOTAL #	TOTAL %
24 or less	17	No age breakdown available	21	No age breakdown available	38	12
25 - 29	33		16		49	16
30 - 34	34		22		56	18
35 - 39	23		23		46	15
40 - 44	9		10		19	6
45 - 49	4		7		11	4
50 - 54	8		6		14	4
55 - 59	12		6		18	6
60 - 64	10		4		14	4
65 & over	2		-		2	0.6
Unknown	45		-		45	14.4
Total	197		115		312	100

o Service Target Ratio

There is no generally accepted service target ratio.

Sensitivity Analysis

No sensitivity analysis was conducted.

The Alberta vacancy survey indicated that 8% of health records administrators work part-time. This rate, if similar across the region, has little impact on the manpower supply. The survey also indicated that almost 30% of helth record technicians work part-time. If this rate were applied to the remaining three provinces, then it would increase that province's requirement or decrease its surplus. Even so, the requirement or surplus is often balanced by the use of health records clerks.

Table XIII.1.1

Province: BRITISH COLUMBIA
Occupation: HEALTH RECORDS

Year	Number of Practitioners	Population to Manpower
1977	176	1:14200
1978	205	1:12350
1979	218	1:11830
1980	229	1:11450

Source:

BRITISH COLUMBIA MEDICAL RECORDS ASSOCIATION

TABLE XIII.1.2

TOTAL NUMBER OF ACTIVE HEALTH RECORDS PERSONNEL

IN BRITISH COLUMBIA, BY AGE

AGE GROUP	MALE	FEMALE	UNKNOWN	TOTAL
20 - 24		17		17
25 - 29		33		33
30 - 34		34		34
35 - 39		23		23
40 - 44		9		9
45 - 49		4		4
50 - 54		8		8
55 - 59		12		12
60 - 64		10		10
65 & over		2		2
Unknown		45		45
Total		197		197

Source: B.C. Medical Records Association

PROVINCIAL ASSUMPTIONS

BRITISH COLUMBIA

a) Legal Controls

There is no licensure controlling the right of health records personnel (administrators and technicians) to practice in British Columbia.

b) Assumptions

Table XIII.1.1, opposite, shows the approximate number of health records personnel in British Columbia. Based on the data obtained from the British Columbia Medical Records Association (B.C.M.R.A.), 46% of members in 1980 were health records administrators, and 54% were health records technicians. This proportion then was used to calculate the factors of migration, immigration and attrition for each group to determine the future manpower supply of administrators and technicians.

The figure for each year has been inflated based on the estimate by the B.C.M.R.A. of 85% membership. This inflation attempts to determine the total labour market supply. For the purposes of this study, it has been assumed that the health records personnel are working full-time. The age distribution of health records personnel as received from the B.C.M.R.A. is shown in Table XIII.1.2, opposite.

o Factors Affecting Manpower Supply

The assumption made with respect to each of the factors which potentially affect manpower stock are shown in Table XIII.1.3, opposite. For each assumption, the information source has been identified. Comments on each factors are shown below:

Table XIII.1.3

Factors Affecting Manpower Supply

Province: BRITISH COLUMBIA
Occupation: HEALTH RECORDS

Factor	Assumption	Source
Opening Stock	229	B.C.M.R.A.[2]
Net Migration	1 for all years	B.C.M.R.A.
Net Immigration	1 for all years	B.C.M.R.A.
Net Occupational Shift[1]	-6% of opening stock	B.C.M.R.A.
Training Output	13 for all years	B.C.I.T.[3]
Attrition	3 for 1981-1989 4 for 1990 2 for 1991-1995 1 for 1996-2000	B.C.M.R.A.

Notes:

[1] Includes Active/Inactive Flows

[2] B.C.M.R.A. IS BRITISH COLUMBIA MEDICAL RECORDS ASSOCIATION

[3] B.C.I.T. IS BRITISH COLUMBIA INSTITUTE OF TECHNOLOGY

Factor	Level of Confidence
. migration	B.C.M.R.A. estimate
. immigration	B.C.M.R.A. estimate
. occupational shift	Based on discussions with the B.C.M.R.A. and related personnel. Indicates a 15 year working life as it is easy to return to the occupation following an absence.
. training output	Registrar, B.C.I.T. Due to the length of the training program, the first administrator graduates to affect the manpower stock will not appear until 1984 (there is no training program for technicians). Therefore, our recommendations focus on the graduating years 1984 to 2000.
. attrition	Age distribution from B.C.M.R.A. and assuming retirement at age 65.

o Estimating Requirements

. Historical Ratio

The current ratio of health records personnel to population of 1;11,450 was used to project the number of personnel required in the future to maintain the current level of manpower.

TABLE XIII.1.4: MANPOWER REQUIREMENTS

PROVINCE: BRITISH COLUMBIA

OCCUPATION: HEALTH RECORDS

PROJECTED MANPOWER REQUIREMENTS

YEAR	PROJECTED STOCK	UTILIZATION APPROACH MEDIUM POPULATION
1981	227	234
NET		7
1982	225	238
NET		13
1983	223	244
NET		21
1984	222	249
NET		27
1985	221	255
NET		34
1990	215	280
NET		65
1995	215	306
NET		91
2000	220	328
NET		108

- Utilization Method

  The 1980 ratio of 1,767 services per health record person was used to project the number of personnel required to maintain the current level of service into the future. The services are based on the number of patient discharges by age and sex. This is the selected scenario for this occupation.

o Net Manpower Requirements

The net manpower requirements under the most likely scenario are shown in Table XIII.1.4 opposite. Based on data from the province of Alberta, a proportion of 1/3 administrators to 2/3 technicians has been used to determine the future manpower requirements of each group. The most likely scenario is based on the utilization approach under the medium population projection. On the basis of this analysis, there is an approximate balance situation of health records personnel.

Table XIII.2.1

Province: ALBERTA
Occupation: HEALTH RECORDS

Year	Number of Practitioners	Population to Manpower
1977	374	1: 5070
1978	458	1: 4260
1979	446	1: 4530
1980	461	1: 4520

Source:

A.H.R.A., Alberta Health Records Association

Table XIII.2.2

Factors Affecting Manpower Supply

Province: ALBERTA
Occupation: HEALTH RECORDS

Factor	Assumption	Source
Opening Stock	461	A.H.R.A.[2]
Net Migration	4 for all years	A.H.R.A.
Net Immigration	Zero for all years	A.H.R.A.
Net Occupational Shift[1]	-6% of stock	A.H.R.A.
Training Output	24 for all years	N.A.I.T.[3] S.A.I.T.
Attrition	1 for all years	A.H.R.A.

Notes:

[1] Includes Active/Inactive Flows

[2] A.H.R.A. is Alberta Health Records Association

[3] N.A.I.T. is Registrar Northern Alberta Institute of Technology
S.A.I.T. is Registrar Southern Alberta Institute of Technology

ALBERTA

a) Legal Controls

There is no legislation controlling the right of health records personnel (administrators and technicians) to practice in Alberta.

b) Assumptions

o Manpower Stock

The approximate number of health records personnel in Alberta is shown in Table XIII.2.1, opposite. Based on the data obtained from the Alberta Health Records Association (A.H.R.A.), 44% of members in 1980 were health record administrators, and 56% were health record technicians. This proportion then was used to calculate the factors of migration, immigration and attrition for each group to determine the future manpower supply of administrators and technicians.

The figure for each year has been inflated based on the estimate by the A.H.R.A. of 80% membership. For the purposes of this study, it has been assumed that the health records personnel are working full-time. There is no available age distribution information.

o Factors Affecting Manpower Supply

The assumption made with respect to each of the factors which potentially affect manpower stock are shown in Table XIII.2.2, opposite. For each assumption, the information source has been identified. Comments on each factor are shown below:

Factor	Level of Confidence
. migration	A.H.R.A. estimate
. immigration	A.H.R.A. estimate
. occupational shift	Based on discussions with the A.H.R.A. and related personnel. Indicates a 15 year working life as it is easy to return to the occupation following an absence.
. training output	Registrars, N.A.I.T. and S.A.I.T. Due to the length of the training programs, the first graduates to affect the manpower stock will not appear until 1983 (technicians) and 1984 (administrators). Therefore, our recommendations focus on these graduating years through to the year 2000.
. attrition	Since an age breakdown was not available, one individual per year has been assumed to retire, based on the A.H.R.A. indications of a young membership.

o Estimating Requirements

. Historical Ratio

The current ratio of health records personnel to population of 1:4,520 was used to project the number of personnel required in the future to maintain the current level of manpower.

TABLE XIII.2.3: MANPOWER REQUIREMENTS

PROVINCE: ALBERTA

OCCUPATION: HEALTH RECORDS

PROJECTED MANPOWER REQUIREMENTS

YEAR	PROJECTED STOCK	UTILIZATION APPROACH MEDIUM POPULATION
1981	460	478
NET		18
1982	459	497
NET		38
1983	458	517
NET		59
1984	458	535
NET		77
1985	458	551
NET		93
1990	458	622
NET		164
1995	458	690
NET		232
2000	458	767
NET		309

- Utilization Method

  The 1980 ratio of 790 services per health record person was used to project the number of personnel required to maintain the current level of service into the future. The services are based on the number of patient discharges by age and sex. This is the selected scenario for this occupation.

o Net Manpower Requirements

Table XIII.2.3, opposite, shows the net manpower requirements under the most likely scenario. Based on data from the government of Alberta, a proportion of 1/3 administrators to 2/3 technicians has been used to determine the future manpower requirements of each group. The most likely scenario is based on the utilization approach under the medium population projection. On the basis of this analysis, there is a small requirement for health records personnel throughout the forecast period.

Table XIII.3.1

Province: SASKATCHEWAN
Occupation: HEALTH RECORDS

Year	Number of Practitioners	Population to Manpower
1976	150	1: 6140
1977	156	1: 6010
1978	150	1: 6320
1979	143	1: 6680
1980	143	1: 6750

Source:

S.H.R.A., SASKATCHEWAN HEALTH RECORDS ASSOCIATION

TABLE XIII.3.2

TOTAL NUMBER OF ACTIVE

HEALTH RECORDS PERSONNEL IN SASKATCHEWAN

AGE GROUP	MALE	FEMALE	TOTAL
20 - 24	-	21	21
25 - 29	-	16	16
30 - 34	1	21	22
35 - 39	1	22	23
40 - 44	-	10	10
45 - 49	-	7	7
50 - 54	1	5	6
55 - 59	-	6	6
60 - 64	-	4	4
65 and over	-	-	-
Unknown	-	-	-
Total	3	112	115

Source: Saskatchewan Health Record Association

SASKATCHEWAN

a) Legal Controls

There is no legislation controlling the right of health records personnel (administrators and technicians) to practice in Saskatchewan.

b) Assumptions

o Manpower Stock

Table XIII.3.1, opposite, shows the approximate number of health records personnel in Saskatchewan. Based on the data obtained from the Saskatchewan Health Records Association (S.H.R.A.), 52% of members in 1980 were health records administrators and 48% were health records technicians. This proportion then was used to calculate the factors of migration, immigration and attrition for each group to determine the future manpower supply of administrators and technicians.

The figure for each year has been inflated based on the estimate by the S.H.R.A. of 80% membership. For the purposes of this study, it has been assumed that the health records personnel are working full-time. The age distribution of health records personnel as received from the S.H.R.A. is shown in Table XIII.3.2, opposite.

o Factors Affecting Manpower Supply

The assumption made with respect to each of the factors which potentially affect manpower stock are shown in Table XIII.3.3, opposite. For each assumption, the information source has been identified. Comments on each factor are shown below:

Table XIII.3.3

Factors Affecting Manpower Supply

Province: SASKATCHEWAN
Occupation: HEALTH RECORDS

Factor	Assumption	Source
Opening Stock	143	S.H.R.A.[2]
Net Migration	0 for 2 years 1 every third year	S.H.R.A.
Net Immigration	0 for 2 years -1 every third year	S.H.R.A.
Net Occupational Shift[1]	-6% of stock	S.H.R.A.
Training Output	14 for all years	WASCANA[3]
Attrition	Actual Retirement	S.H.R.A.

Notes:

[1] Includes Active/Inactive Flows

[2] S.H.R.A. IS SASKATCHEWAN HEALTH RECORDS ASSOCIATION

[3] WASCANA IS REGISTRAR WASCANA INSTITUTE

Factor	Level of Confidence
. migration	S.H.R.A. estimate
. immigration	S.H.R.A. estimate
. occupational shift	Based on discussions with the S.H.R.A. and related personnel. Indicates a 15 year working life as it is easy to return to the occupation following an absence.
. training output	Registrar, Wascana Institute. Due to the length of training programs, the first graduates to affect the manpower stock will not appear until 1983 (technicians) and 1984 (administrators). Therefore, our recommendations focus on these graduating years through to the year 2000.
. attrition	Age distribution from S.H.R.A. and assuming retirement at age 65.

o Estimating Requirements

. Historical Ratio

The current ratio of health records personnel to population of 1;6,750 was used to project the number of personnel required in the future to maintain the current level of manpower.

TABLE XIII.3.4: MANPOWER REQUIREMENTS

PROVINCE: SASKATCHEWAN

OCCUPATION: HEALTH RECORDS

PROJECTED MANPOWER REQUIREMENTS

YEAR	PROJECTED STOCK	UTILIZATION APPROACH MEDIUM POPULATION
1981	147	145
NET		-2
1982	151	148
NET		-3
1983	155	155
NET		-5
1984	159	153
NET		-6
1985	163	155
NET		-8
1990	177	165
NET		-12
1995	186	173
NET		-13
2000	193	182
NET		-11

- Utilization Method

  The 1980 ratio of 1,367 services per health record person was used to project the number of personnel required to maintain the current level of service into the future. The services are based on the number of patient discharges by age and sex. This is the selected scenario for this occupation.

o Net Manpower Requirements

The net manpower requirements under the most likely scenario are shown in Table XIII.3.4, opposite. Based on data from the province of Alberta, a proportion of 1/3 administrators to 2/3 technicians has been used to determine the future manpower requirements of each group. The most likely scenario is based on the utilization approach under the medium population projection. On the basis of this analysis, there is a balance of health records manpower during the forecast period.

Table XIII.4.1

Province: MANITOBA
Occupation: HEALTH RECORDS

Year	Number of Practitioners	Population to Manpower
1976	121[1]	1: 8440
1977	146[1]	1: 7050
1978	161[1]	1: 6420
1979	158[1]	1: 6630
1980	164[2]	1:6430

SOURCE:

1 HEALTH MANPOWER PROVINCIAL REPORT - MANITOBA

2 MANITOBA HEALTH RECORDS ASSOCIATION

Table XIII.4.2

Factors Affecting Manpower Supply

Province: MANITOBA
Occupation: HEALTH RECORDS

Factor	Assumption	Source
Opening Stock	164	M.H.R.A.[2]
Net Migration	1 for all years	M.H.R.A.
Net Immigration	Zero for all years	M.H.R.A.
Net Occupational Shift[1]	-6% of stock	M.H.R.A.
Training Output	24 for all years	Red River[3]
Attrition	1 for all years	M.H.R.A.

Notes:

[1] Includes Active/Inactive Flows

[2] M.H.R.A. is Manitoba Health Records Association

[3] Red River is Registrar Red River College

MANITOBA

a) Legal Controls

There is no legislation controlling the right of health records personnel (administrators and technicians) to practice in Manitoba.

b) Assumptions

o Manpower Stock

The approximate number of health records personnel in Alberta is shown in Table XIII.4.1, opposite. Based on the data obtained from the Manitoba Health Records Association (M.H.R.A.), 24% of members in 1980 were health record administrators, and 76% were health record techniciana. This proportion then was used to calculate the factors of migration, immigration and attrition for each group to determine the future manpower supply of administrators and technicians.

The figure for 1[illegible]as been inflated based on the estimate of the M.H.R.A. that 90% of administrators and 75% of techniciana were members. For the purposes of this study, it has been assumed that the health records personnel are working full-time. There is no available age distribution information.

o Factors Affecting Manpower Supply

The assumption made with respect to each of the factors which potentially affect manpower stock are shown in Table XIII.4.2, opposite. For each assumption, the information source has been identified. Comments on each factor are shown below:

Factor	Level of Confidence
. migration	M.H.R.A. estimate
. immigration	M.H.R.A. estimate
. occupational shift	Based on discussions with the M.H.R.A. and related personnel. Indicates a 15 year working life as it is easy to return to the occupation following an absence.
. training output	Registrars, Red River Community College. Due to the length of the training program, the first technician graduates to affect the manpower stock will not appear until 1983 (there is no training program for administrators). Therefore, our recommendations focus on the graduating years 1983 to 2000.
. attrition	Since an age breakdown was not available, one individual per year has been assumed to retire, based on the M.H.R.A. indication of a young membership.

o Estimating Requirements

. Historical Ratio

The current ratio of health records personnel to population of 1:6,430 was used to project the number of personnel required in the future to maintain the current level of manpower.

TABLE XIII.4.3: MANPOWER REQUIREMENTS

PROVINCE: MANITOBA

OCCUPATION: HEALTH RECORDS

PROJECTED MANPOWER REQUIREMENTS

YEAR	PROJECTED STOCK	UTILIZATION APPROACH MEDIUM POPULATION
1981	178	166
NET		-12
1982	191	167
NET		-24
1983	204	169
NET		-35
1984	216	170
NET		-46
1985	227	172
NET		-55
1990	273	178
NET		-95
1995	307	183
NET		-124
2000	332	188
NET		-144

- Utilization Method

  The 1980 ratio of 993 services per health record person was used to project the number of personnel required to maintain the current level of service into the future. The services are based on the number of patient discharges by age and sex. This is the selected scenario for this occupation.

o Net Manpower Requirements

Table XIII.4.3, opposite, shows the net manpower requirements under the most likely scenario. Based on data from the government of Alberta, a proportion of 1/3 administrators to 2/3 technicians has been used to determine the future manpower requirements of each group. The most likely scenario is based on the utilization approach under the medium population projection. On the basis of this analysis, there is a small requirement for health records personnel throughout the forecast period.

APPENDIX IV - BIBLIOGRAPHY

HEALTH RECORDS PERSONNEL

BIBLIOGRAPHY

Alberta Career Resources Branch, Advanced Education and Manpower. Occupational Profiles - Health Record Administrator. Edmonton: October 1979.

----------. Occupational Profiles - Health Record Technician. Edmonton: October 1979.

Alberta Social Services and Community Health, Alberta Health & Social Services Disciplines Committee, Research and Planning Division. Health and Social Services Manpower in Alberta, 1979. Edmonton.

----------. September 30, 1980 Survey of Major Employers of Health and Social Service Personnel in Alberta. Edmonton: February 1981.

Manes, Rose T. "Medical Record Personnel: Does the Supply Meet the Demand?" Medical Record News, Vol. 46 (June 1975), pp. 21-30.

Manitoba, Province of, Departments of Health and Community Services, Research Section, Barbara Miller. Health Manpower Provincial Report, Manitoba 1979. Winnipeg: 1979.

Ontario, Province of, Department of Health. Manpower Provincial Report. Toronto.

Saskatchewan, Province of, Department of Health, Policy Research and Management Services Branch. Saskatchewan Health Manpower Annual Report - 1978. Regina.

University of British Columbia, Division of Health Services Research and Development, Health Sciences Centre. Production 79 -- A Status Report on the Production of Health and Human Services Personnel in the Province of British Columbia. Vancouver: 1980.

----------. Rollcall 79. Vancouver: 1980.

Province of
British Columbia

Province of
Alberta

Province of
Saskatchewan

Province of
Manitoba

WESTERN CANADA
HEALTH MANPOWER TRAINING STUDY

Category # 3 Report XIV

MEDICAL LABORATORY TECHNOLOGISTS

Report XIV - MEDICAL LABORATORY TECHNOLOGISTS
Report XV - OCCUPATIONAL THERAPISTS
Report XVI - PHARMACISTS

REPORT XIV

MEDICAL LABORATORY TECHNOLOGISTS:

THE REQUIREMENT FOR ALTERNATIVE TRAINING AND FUNDING ARRANGEMENTS IN WESTERN CANADA

Report XIV - OCCUPATIONAL THERAPISTS

REPORT XIV

MEDICAL LABORATORY TECHNOLOGISTS

TABLE OF CONTENTS

	PAGE
I. INTRODUCTION	
Study Background	1
Study Objectives	1
Study Approach	2
Occupation Definition	4
II. TRAINING NEEDS IN WESTERN CANADA	
Manpower Requirements	5
Existing Training Programs	6
Occupational Issues	6
III. TRAINING RESPONSES	
Decision Process	9
Timing and Location of Manpower Requirement	9
Indicated Manpower Responses	10
Defined Alternative Locations	12
IV. RECOMMENDATIONS	14

APPENDIX I - Study Approach and Methodology

APPENDIX II - Provincial Net Manpower Requirement

APPENDIX III - Scope of Practice

APPENDIX IV - Bibliography

I. INTRODUCTION

STUDY BACKGROUND

The provision of effective health services to the community is, to a considerable degree, dependent on three essential resources:

- an adequate supply of well trained specialist staff in each health occupation group
- the development of adequate facilities to service the community
- the availability of adequate funds to ensure cost-effective and efficient health services.

The range and complexity of health treatment programs has expanded greatly in Canada during the last twenty-five years. In addition, changing technology and the development of new treatment programs have resulted in an increased requirement for skilled, adequately trained health manpower. These factors have resulted in an increased emphasis on manpower planning and skill training for health occupations to ensure an adequate supply of trained practitioners to meet defined manpower requirements.

STUDY OBJECTIVES

The Western Canada Health Manpower Training Study was initiated by the western Premiers at their annual conference in 1980. The study terms of reference contain two major objectives. These are:

- to assess the existing and future needs for health manpower training programs and facilities in western Canada

- to make recommendations for the rationalization of the location and funding of health manpower training programs and facilities in western Canada.

STUDY APPROACH

The study was under the direction of a Steering Committee consisting of health and education representatives from the Provinces of British Columbia, Alberta, Saskatchewan and Manitoba. The study took place over two years and consisted of a review of 26 health occupations grouped into five categories. Each occupation has been studied separately, and a report has been produced for each. In addition, a report examining the inter-relations of the occupations has been submitted to the Steering Committee.

Data was collected from provincial and national associations and from government agencies for each of the occupations on the numbers of individuals registered with the associations and their current status as active or inactive practitioners. An attempt was also made to gather data on historical trends, the number of graduates from training, trends in movement of active practitioners to inactive status, occupational shifts out of the profession, trends in migration to and from other provinces, and immigration and emigration.

In the cases where validated and reliable information was not available, association spokesmen, employers and individuals in each of the occupations were interviewed to provide qualitative opinions regarding present and future trends affecting the manpower supply and requirement.

A literature review was conducted to examine the problems facing the occupation. A bibliography of the material reviewed is contained in Appendix IV.

A health manpower computer model was developed to assist in the preparation of projections on the future supply and requirement for each occupation. A critical analysis of these twenty-year projections was then undertaken to develop the various supply and requirement scenarios presented in this report.

Separate documents describing the manpower planning methodology and the training decision-making process were issued. A brief summary of the overall study approach and methodology is set out in Appendix I and details of the provincial net requirements are set out in Appendix II.

Report XV - OCCUPATIONAL THERAPISTS

OCCUPATION DEFINITION

This report addresses the need for training programs for medical laboratory technologists in each of the four provinces. For the purpose of this study, a medical laboratory technologist is defined as an individual who:

"performs medical laboratory tests, procedures, experiments and analyses for diagnosis, treatment and prevention of disease. Conducts chemical analyses of blood, urine, cerebrospinal and other body fluids to ascertain normal and abnormal constituents. Studies blood cells, their numbers, morphological characteristics and coagulation factors related to various physiological and pathological conditions. Prepares tissue sections for microscopic examination using fixation, imbedding, cutting and staining techniques to demonstrate special cellular tissue elements or other characteristics. Studies micro-organisms which cause disease and their effect upon the human body, using a variety of microscopic and macroscopic techniques. Performs blood group, type and compatability tests for transfusion purposes. Investigates responses of body to foreign cells or agents."[1]

1. Canadian Classification and Dictionary of Occupations, No. 3156, 1980 Revision

EXHIBIT 1

MANPOWER REQUIREMENTS

WESTERN CANADA, MEDICAL LABORATORY TECHNOLOGISTS

(BASED ON MOST LIKELY SCENARIO FROM EACH PROVINCE)

YEAR	PROJECTED STOCK	PROJECTED REQUIREMENT
1981	6,102	6,188
NET		86
1982	6,140	6,338
NET		198
1983	6,176	6,494
NET		318
1984	6,212	6,645
NET		433
1985	6,241	6,786
NET		545
1990	6,415	7,466
NET		1,051
1995	6,567	8,097
NET		1,530
2000	6,701	8,685
NET		1,984

II. TRAINING NEEDS IN WESTERN CANADA

This section presents the statistical data for manpower requirements for western Canada, reviews the basis for projection and the confidence in basic data, outlines existing training programs for medical laboratory technologists, and discusses the major isues influencing the occupation.

MANPOWER REQUIREMENTS

Exhibit 1, opposite, shows the projected stock and requirement for medical laboratory technologists during the period 1981 - 2000. These projections are based on the most likely scenario derived for each province. They show an average annual requirement of approximately 100 additional practitioners for western Canada throughout the forecast period.

Methodology

For each province, the most likely scenario has been based on the population ratio approach. There was no identified service target ratio for this occupation and since there is no comprehensive record of services by age and sex of recipient in both public and private laboratories, the utilization approach was inappropriate. The approaches used to determine manpower requirements are discussed in Appendix I.

Degree of Confidence in Data

Projections of manpower supply have been prepared based on current manpower stock, net migration, net immigration, occupational shift including active/ inactive movements, training outputs and attrition. Provincial medical laboratory associations exist in British Columbia, Alberta and Saskatchewan; Manitoba has no association. The Canadian Society of Laboratory Technologists (C.S.L.T.) had the most accurate membership records, although

TABLE I

EXISTING TRAINING PROGRAMS - WESTERN CANADA

MEDICAL LABORATORY TECHNOLOGISTS

PROVINCE	PROGRAMS	GRADUATES IN 1981
British Columbia:	2	85
Alberta:	3	94
Saskatchewan:	2	80
Manitoba:	1	56

registration in either the provincial or national association is not mandatory for employment. The C.S.L.T. data used for the calculations of manpower supply could be underestimated in all factors. The three associations estimated their membership in the C.S.L.T. and the stock has been adjusted accordingly, thus producing more accurate manpower supply numbers. Overall, the data utilized in our projections is acceptable from a forecasting point of view.

The assumptions made for manpower supply are shown in Appendix II.

EXISTING TRAINING PROGRAMS

The existing training programs for medical laboratory technologists are shown in Table I, opposite. In addition, British Columbia has a 2 year upgrading program for 2 year diploma graduates.

A more detailed discussion of these training programs is contained in Report 3-A, "The Scope of Existing Training Programs Category III Occupations".

OCCUPATIONAL ISSUES

Several trends and issues will affect medical laboratory technologists in the forecast period. These are:

- Technological Change

  Given the changes in equipment and testing methods, it is becoming increasingly difficult for an individual to return to the occupation without receiving some form of refresher training.

o Increase in Number of Tests

It appears that with the new equipment and testing methods more tests can be conducted, but they are done more efficiently and thereby have a minimal impact on manpower requirements.

o Length of Employment

A number of developments in the laboratory technology field may result in lessened job satisfaction for non-supervisory personnel. These trends include increased automation, greater specialization, reduced patient contact, and increased requirements for shift work.

This potential for reduced job satisfaction may result in a reduction of the length of time which a technologist remains employed in the profession.

o Non-Specialist Personnel

The combined X-ray/medical laboratory technician is trained in basic diagnostic test procedures in both X-ray and Laboratory Technology. The primary employment opportunities for this occupation are in rural hospitals and clinics. Because they do not have the training to conduct sophisticated tests, they cannot help meet the region's requirement for medical laboratory technologists.

o Female Practitioners

It is estimated that approximately 90% of the medical laboratory technologists in western Canada are female. Data is not available on the number of males entering training, and consequently no attempt has been made to estimate the future composition of the workforce.

o Pattern of Employment

Based on survey data from the provinces of Alberta and Saskatchewan, it is estimated that approximately 85% of medical laboratory technologists work full-time.

There is no information available on the number of hours worked by part-time employees, and consequently, no attempt has been made to calculate full-time equivalent practitioners.

EXHIBIT 2

MEDICAL LABORATORY TECHNOLOGISTS

NET MANPOWER REQUIREMENTS BY PROVINCE AND REGION

YEAR	BRITISH COLUMBIA		ALBERTA		SASKATCHEWAN		MANITOBA		REGION	
	Stock	Req.	Stock	Req.	Stock	Req.	Stock	Req.	Stock	Req.
1981	2367	2401	2144	2176	789	787	802	824	6102	6188
Net		34		32		-2		22		86
1982	2377	2451	2184	2260	792	798	787	829	6140	6338
Net		74		76		6		42		198
1983	2387	2501	2222	2349	794	810	773	834	6176	6494
Net		114		127		16		61		318
1984	2396	2551	2260	2433	796	822	760	839	6212	6645
Net		155		173		26		79		433
1985	2404	2601	2291	2506	798	834	748	845	6241	6786
Net		197		215		36		97		545
1990	2444	2846	2458	2856	808	891	705	873	6415	7466
NET		402		398		83		168		1051
1995	2475	3067	2606	3192	810	942	676	896	6567	8097
NET		592		586		132		220		1530
2000	2501	3260	2735	3520	810	989	655	915	6701	8685
NET		759		785		179		261		1984

NOTE: Most Likely Scenario

Population Ratio Method

III - TRAINING RESPONSES

DECISION PROCESS

The decision process, outlined in Appendix I and discussed in detail in Report C, "A Decision Process To Evaluate the Location of, and Funding Arrangements for Health Occupation Training Programs in Western Canada", was used to evaluate the training implications of the net manpower requirements for medical laboratory technologists discussed above. This section contains the results of this analysis.

TIMING AND LOCATION OF MANPOWER REQUIREMENT

Exhibit 2, opposite, shows the projected manpower requirement under the most likely scenario for the period 1981 - 2000 for each of the provinces. As the exhibit indicates, there is an immediate requirement for additional practitioners in each of the provinces, with British Columbia and Alberta showing the largest requirement. Specific discussion of the net manpower requirements for each province follows:

- British Columbia - has a net requirement for an additional 40 practitioners per year throughout the forecast period.

- Alberta - has a net requirement for an additional 41 practitioners per year throughout the forecast period.

- Saskatchewan - has a net requirement for 9 additional practitioners per year throughout the forecast period. This requirement is primarily due to the number of practitioners leaving the province.

- o Manitoba - has a net requirement for an additional 14 practitioners per year throughout the forecast period. This requirement arises from the number of individuals migrating and immigrating out of the province.

In addition to the information obtained from the professional association on active registered stock, data from the March 1981 vacancy survey in the province of Alberta has been used to determine the surplus, or requirement for medical laboratory technologists in Alberta. This survey indicates that there were 1092 budgeted positions in the province. The association indicated that there was 2103 registered members in 1980. This indicates that approximately 52% of active registered members of the association were employed and that there is a large labour market pool of practitioners available. For a further discussion of labour market supply refer to Appendix I. This large inactive pool is consistent with the indicated low vacancy rate of 5%.

The training recommendations for the province of Alberta have been developed on the assumption that the province will wish to maintain this relationship between labour market supply and the number employed, and train the required number of practitioners to maintain this current balance.

INDICATED MANPOWER RESPONSES

Two different types of training responses are required: refresher and basic training. These are discussed below:

Refresher Training

Medical laboratory technology is primarily a female dominated occupation, and in the absence of definitive data, estimates have been obtained from provincial associations which indicate that typically, technologists work an average of approximately 20 years in the profession. In addition, data from

the vacancy survey in the province of Alberta indicates that there are approximately 1000 registered technologists who are currently not employed as medical laboratory technologists. Therefore it is appropriate to develop recruitment and retention strategies to limit the number of individuals who leave active employment.

In addition, however, data from the Canadian Society of Laboratory Technologists indicates that there is a pool of inactive medical laboratory technologists in each of the provinces in western Canada. The potential for these individuals to return to active employment is not known. It is realistic, however, to anticipate that this pool of inactive practitioners represents a significant source of additional manpower.

Given the rapid rate of technological change it is suggested that medical laboratory technologists returning to the work force should receive some form of refresher training to enhance skills to meet the projected manpower need.

There is no evidence to prove that employers require prospective employees to undergo formal college based refresher training programs. An assumption has been made, based on comments from provincial associations, that some form of refresher training mechanism would facilitate the transition from inactive to active practitioner. This would result in a better trained and more confident employee, with up to date skills.

To meet a manpower need, it is cheaper and faster to retrain experienced practitioners than to have individuals new to the occupation go through the total training program. It therefore appears that given the changing technology, the immediate manpower requirement and the inactive pools of medical laboratory technologists in each province, refresher training mechanisms are an effective and relatively inexpensive means of meeting that manpower need.

Refresher training is not a mandatory requirement for registration with the provincial or national associations and some on-the-job refresher training is currently being conducted. Additionally, some provincial associations provide refresher courses. However, the provinces cannot rely exclusively on employers and associations to provide the refresher training necessary to encourage inactive technologists back into the work force in numbers which will meet each province's manpower requirement. It is therefore suggested that each of the provinces provide technical assistance in developing refresher training mechanisms to facilitate inactive practitioners returning to the work force. These mechanisms could include brief sessions on learning new equipment, the development of learning packages for employers to review with new employees, or a series of evening sessions.

Basic Programs

Basic training programs for medical laboratory technologists exist in each province. Expanding the enrolment is one method of producing more graduates. Another method is to improve the student output to input ratio in the basic program. This increase in retention will give the province more graduates without expanding the enrolment. In this occupation, however, each new graduate is required to participate in a clinical program. This means that if graduate numbers are increased, the clinical spaces will have to be increased accordingly.

DEFINED ALTERNATIVE LOCATIONS

The range of alternative locations to provide the training for medical laboratory technologists is dependent on the cost to the training program. Training in this occupation requires access to sophisticated equipment. Given the cost involved, utilizing the current program locations is more cost effective than establishing programs in new locations.

British Columbia, Alberta and Saskatchewan have medical laboratory technologist programs in both college and university locations. Manitoba has a college program only. Graduates of the university programs are usually designated as future supervisors. When each province contemplates an increase in the number of training programs or in their enrolment, it must consider the need for supervisors when deciding which program to increase.

The concept of centralized regional training for medical laboratory technologists was evaluated as an alternative training strategy. It is not practical to have only one or two provinces supplying the western region with technologists for the following reasons:

- The predominantly female stock might be reluctant to move to another province.

- There is no guarantee that the students will return to their home province because, upon graduation, the technologists are often hired by the laboratories where they undergo the clinical aspect of their training.

IV. RECOMMENDATIONS

Recommendations for each of the four provinces are set out below.

- British Columbia

.1- That British Columbia continue to offer the refresher course given in 1981 to enrol 25 students.

.2- That British Columbia expand the enrolment in the current programs by 20 students to total 145 students.

- Alberta

.3- That Alberta develop a refresher course to enrol 25 students.

.4- That Alberta maintain the enrolment levels in the current training programs.

.5- That Alberta improve the student output to input ratio in the current programs so that more graduates can be produced without expanding the program enrolment.

- Saskatchewan

.6- That Saskatchewan develop a refresher course to enrol 15 students.

.7- That Saskatchewan maintain the enrolment levels in the current training programs.

- Manitoba

.8- That Manitoba develop a refresher course to enrol 20 students.

.9- That Manitoba maintain the enrolment levels in the current training program.

- Western Canada

.10- That each province should increase the number of clincial spaces available according to the increase in enrolment in medical laboratory technology programs.

APPENDIX I

STUDY APPROACH AND METHODOLOGY

STUDY APPROACH

Introduction

In order to achieve the study objectives, the work program consists of three key activities. These are:

- the analysis of manpower supply and requirements, and the calculation of net manpower requirements
- the analysis of existing training programs for Western Canada
- the development of recommendations for alternative training locations and funding arrangements

Analysis of Manpower Supply and Requirements

The analysis of manpower supply and requirements is designed to allow for a variety of data inputs, and for different emphasis depending on the occupation under review. A variety of data sources are used including provincial and national associations, health insurance agencies, and provincial health and education departments. In all instances, data is developed independently of previously published sources.

In addition to the basic projection of net manpower requirements, a number of sensitivity analyses have been completed to assess the impact of changed in the factors affecting supply and requirements, prior to developing recommendations for either additional training programs, or expanding existing training programs.

Approaches to Determining Manpower Requirements

The approach developed to determine manpower requirements uses three methods of projection. These are discussed below.

1. Service Utilization Approach

The utilization approach is based on an analysis of the pattern of health service usage. It establishes trends in service utilization and projects these onto future population estimates. There are three steps in the service utilization approach.

Step 1 - Determine Per Capita Utilization Rate

Historical data of the number of services provided, by age and sex of recipient is derived. The number of services per age/sex group is then divided by the population for group in the corresponding year. This results in a per capita utilization rate.

Step 2 - Project Future Service Required

The per capita utilization rate is projected onto the low, medium and high population for each year from 1981 to 2000. This results in an estimate of total future services.

Step 3 - Estimated Number of Practitioners Required

Having determined the total future services, the model projects the number of practitioners required, by assuming a constant level of services per practitioner. The number of services per practitioner is determined by dividing total services by the number of practitioners in the base year. To estimate the required number of practitioners, the model divides total future services required by the number of services per practitioner.

2. Service Target Ratio Approach

Service target ratios reflect a theorectical optimal manpower level required to meet health service requirements in the occupation under review. They are expressed as the ratio of practitioner to population. The service target ratios are derived based on discussion with health authorities, review of published reports, articles and summary of defined health care needs.

3. Population Ratio Approach

Population ratios are derived by dividing the total population at a specific point in time by the number of active practitioners. This results in a ratio of practitioners to population.

These ratios are analysed to determine if any trends exists. to project futuren manpower requirements, the model divides total projected population by the previously determined population ratio.

Summary of Approaches to Projecting Manpower Requirements

The three approaches outlined above have been used for the calculation of manpower requirements for this occupation. The specific application of each approach to this occupation is discussed under General Assumption, Appendix II, following.

Development of Recommendations for Alternative Training Locations and Funding Arrangements

We have developed a decision process to assist in developing recommendations for alternative training location(s) and funding arrangements. This process is designed to allow for the logical, consistent evaluation of a range of training alternatives.

There are seven steps in the decision process:

- Step 1. Analysis of manpower requirements
- Step 2. Identification of the appropriate type(s) of training
- Step 3. Definition of alternative training locations
- Step 4. Evaluation of alternative locations for new programs
- Step 5. Establishment of timing of training program requirement
- Step 6. Recommendation on training action(s) and location(s)
- Step 7. Recommendation on funding alternative(s)

LABOUR MARKET SUPPLY

Labour market supply is the relationship between the estimated number of practitioners registered with the provincial associations, the number of practitioners actually employed and the number of vacant positions. Vacancy survey data (normally collected by provincial governments) will identify the total number of budgeted positions, which is the total of the number currently employed plus vacancies.

Labour market supply is a useful tool to estimate, or determine the employment situation for each occupation. The current supply situation is expressed as total budgeted positions divided by the total number of registered practitioners. This percentage (%) of qualified practitioners who are currently employed will indicate the flexability of the existing labour market.

Paper IV - OCCUPATIONAL TRAINING

Typicaily the flexability of the labour market will reflect vacancy rates. The following table illustrates theoretical labour market situations:

"Tight" labour market - 90% - 95% of practitioners actively employed with a vacancy rate of 12% to 20%.

"Balanced" Labour Market - 80% - 90% of practitioners actively employed with a vacancy rate of 8% to 12%.

"Loose" Labour Market - 70% - 80% of practitioners actively employed with a vacancy rate of 0% to 8%.

APPENDIX II

PROVINCIAL NET MANPOWER REQUIREMENTS

Table XIV.0.1

Number of Practitioners by Province in Western Canada

Occupation: MED LAB TECHNOLOGISTS

Year	British Columbia[1]	Alberta[2]	Saskatchewan[3]	Manitoba[4]
1973	1326	1191	567	-
1974	1397	1441	597	650
1975	1641	1471	653	699
1976	1788	1556	681	723
1977	1909	1648	627	765
1978	2013	1716	726	779
1979	2164	1890	747	807
1980	2356	2103	777	818

Notes:

SOURCE IS CANADIAN SOCIETY OF LABORATORY TECHNOLOGISTS (C.S.L.T.)

Table XIV.0.2

Factors Affecting Manpower Supply in Western Canada

Occupation: MED LAB TECHNOLOGISTS

Factor	British Columbia	Alberta
Opening Stock	2356	2103
Net Migration	2.6% of stock	3.4% of stock
Net Immigration	-3 for all years	1 for all years
Net Occupation Shift	-5% of stock	-5% of stock
Training Output	93 for all years	94 for all years
Attrition	-1% of opening stock	-1% of stock

	Saskatchewan	Manitoba
Opening Stock	777	818
Net Migration	-3.4% of stock	-2.5% of stock
Net Immigration	-3 for all years	-2 for all years
Net Occupation Shift	-5% of stock	-5% of stock
Training Output	80 for all years	55 for all years
Attrition	-1% of opening stock	-1% of opening stock

GENERAL ASSUMPTIONS

Manpower Stock

Table XIV.0.1, opposite, shows the approximate total number of medical laboratory technologists in Western Canada. It indicates those practitioners who are active in their respective provinces as identified by the sources noted at the bottom of the table.

Factors Affecting Manpower Supply

The assumptions made with respect to each of the factors which have the potential to affect manpower stock are shown opposite in Table XIV.0.2. These factors include migration, immigration, occupational shift, training output, and attrition. Since age distribution data did not exist in any province, a percentage of stock was removed each year to account for attrition. It should be noted that stock has been based on the provincial association estimates of the number of members who are actively registered. For specific discussion refer to provincial assumptions. As a result of these estimates, the stock figures will not equate with previously published manpower data.

Estimating Requirements

- Historical Ratio

  For each province, the current ratio of medical laboratory technologists to population was used to project the number of practitioners required in the future to maintain the current level of manpower. The last year available was the consistent methodology used as it most accurately reflects the current manpower situation.

o Utilization Method

There are no comprehensive records of services by age and sex in both public and private laboratories. Therefore, the utilization method was not selected for this study.

o Service Target Ratio

There is no generally accepted service target ratio.

Sensitivity Analysis

No sensitivity analysis was conducted.

According to the Province of Alberta's vacancy survey, approximately one fifth of medical laboratory technologists work part-time. If a part-time rate could be applied to the four provinces, then it would result in an increase in the manpower requirement in each province.

Table XIV.1.1

Province: BRITISH COLUMBIA
Occupation: MED LAB TECHNOLOGISTS

Year	Number of Practitioners	Population to Manpower
1973	1926	1: 1730
1974	1397	1: 1715
1975	1641	1: 1500
1976	1788	1: 1370
1977	1909	1: 1300
1978	2013	1: 1260
1979	2164	1: 1190
1980	2356	1: 1110

Source:

C.S.L.T. IS CANADIAN SOCIETY OF LABORATORY TECHNOLOGISTS

Table XIV.1.2

Factors Affecting Manpower Supply

Province: BRITISH COLUMBIA
Occupation: MED LAB TECHNOLOGISTS

Factor	Assumption	Source
Opening Stock	2356	C.S.L.T.[2]
Net Migration	2.6% of stock	C.S.L.T.
Net Immigration	-3 for all years	C.S.L.T.
Net Occupational Shift[1]	-5% of stock	B.C.S.L.T.[3]
Training Output	93 for all years	MINISTRY OF EDUCATION
Attrition	-1% of opening stock	ESTIMATE

Notes:

[1] Includes Active/Inactive Flows

[2] C.S.L.T. IS CANADIAN SOCIETY OF LABORATORY TECHNOLOGISTS

[3] B.C.S.L.T. IS BRITISH COLUMBIA SOCIETY OF LABORATORY TECHNOLOGISTS

PROVINCIAL ASSUMPTIONS

BRITISH COLUMBIA

a) Legal Controls

Compulsory licensure controlling the right to practice does not exist for the medical laboratory technologist occupation in British Columbia.

b) Assumptions

o Manpower Stock

Table XIV.1.1, opposite, shows the approximate total number of medical laboratory technologists in the Province. The 1980 figure excludes those technologists who are working in other occupations or in the combined x-ray/medical laboratory technician occupation. The figure for each year has been inflated based on the estimate of 85% membership by the B.C. Branch of the Canadian Society of Laboratory Technologists. For the purposes of this study, it has been assumed that the technologists are working full-time. Since an age distribution of members was not available, a percentage of stock has been selected to represent a reasonable attrition rate within the occupation. It should be noted that data from the association refers to November 1980, while data quoted in Rollcall is from July. This, and the estimates used, account for differences in basic stock data.

o Factors Affecting Manpower Supply

The assumptions made with respect to each of the factors which potentially affect manpower stock are shown in Table XIV.1.2, opposite. In each assumption, the information source has been identified. Comments on each factor are shown below:

Factor	Level of Confidence
. migration	C.S.L.T. records.
. immigration	C.S.L.T. records.
. occupational shift	B.C. Branch C.S.L.T. estimate of a 20 year working life.
. training output	Ministry of Education. Includes graduates from upgrading programs. Due to the length of the training programs, the first graduates to affect the manpower stock will not appear until 1984. Therefore, our recommendations focus on the period 1984 to 2000.
. attrition	Since an age distribution of members was not available, 1% of stock was selected as a reasonable attrition rate.

o Estimating Requirements

. Historical Ratio

The current ratio of medical laboratory technologists to population of 1:1,110 was used to project the number of technologists required in the future to maintain the current level of manpower. This method of calculation is the selected scenario as it is the most accurate available.

TABLE XIV.1.3: MANPOWER REQUIREMENTS

PROVINCE: BRITISH COLUMBIA

OCCUPATION: MEDICAL LABORATORY TECHNOLOGISTS

PROJECTED MANPOWER REQUIREMENTS

YEAR	PROJECTED STOCK	POPULATION RATIO 1:1,113 MEDIUM POPULATION
1981	2,367	2,401
NET		34
1982	2,377	2,451
NET		74
1983	2,387	2,501
NET		114
1984	2,396	2,551
NET		155
1985	2,404	2,601
NET		197
1990	2,444	2,846
NET		402
1995	2,475	3,067
NET		592
2000	2,501	3,260
NET		759

- Utilization Method

  The proportion of 96,160 services per technologist was used to project the number of medical laboratory technologists required to maintain the current level of service into the future. However, since the data did not include private laboratories, and since it was not age/sex sensitive, it was not the preferred method of calculation.

o Net Manpower Requirements

The net manpower requirements under the most likely scenario are shown in Table XIV.1.3, opposite. The most likely scenario is based on the population ratio under the medium population projection. On the basis of this analysis, there is an immediate requirement for medical laboratory technologists throughout the forecast period.

Table XIV.2.1

Province: ALBERTA
Occupation: MED LAB TECHNOLOGISTS

Year	Number of Practitioners	Population to Manpower
1973	1191	1: 1410
1974	1441	1: 1190
1975	1471	1: 1200
1976	1556	1: 1180
1977	1648	1: 1150
1978	1716	1: 1140
1979	1890	1: 1070
1980	2103	1: 990

Source:

C.S.L.T. IS CANADIAN SOCIETY OF LABORATORY TECHNOLOGISTS

Table XIV.2.2

Factors Affecting Manpower Supply

Province: ALBERTA
Occupation: MED LAB TECHNOLOGISTS

Factor	Assumption	Source
Opening Stock	2103	C.S.L.T.[2]
Net Migration	3.4% of stock	C.S.L.T.
Net Immigration	1 for all years	C.S.L.T.
Net Occupational Shift[1]	-5% of stock	A.C.S.L.T.[3]
Training Output	94 for all years	N.A.I.T.[4] S.A.I.T. U. OF A.
Attrition	-1% of stock	ESTIMATE

Notes:

[1] Includes Active/Inactive Flows

[2] C.S.L.T. IS CANADIAN SOCIETY OF LABORATORY TECHNOLOGISTS

[3] A.C.S.L.T. IS ALBERTA BRANCH CANADIAN SOCIETY OF LABORATORY TECHNOLOGISTS

[4] N.A.I.T. IS REGISTRAR NORTHERN ALBERTA INSTITUTE OF TECHNOLOGY

S.A.I.T. IS REGISTRAR SOUTHERN ALBERTA INSTITUTE OF TECHNOLOGY

U. OF A. IS UNIVERSITY OF ALBERTA

ALBERTA

a) Legal Controls

There is no legislation controlling the right of medical laboratory technologists to practice in Alberta.

b) Assumptions

o Manpower Stock

The approximate total of medical laboratory technologists in the Province is shown in Table XIV.2.1, opposite. The 1980 figure excludes those technologists who are working in other occupations or in the combined x-ray/medical laboratory technician occupation. The figure for each year has been inflated based on the estimate of 80% C.S.L.T. membership by the Alberta Branch of the Canadian Society of Laboratory Technologists. For the purposes of this study, it has been assumed that the technologists are working full-time. Since an age distribution of members was not available, a percentage of stock has been selected to represent a reasonable attrition rate within the occupation.

o Factors Affecting Manpower Supply

The assumptions made with respect to each of the factors which potentially affect manpower stock are shown in Table XIV.2.2, opposite. For each assumption, the source of information has been identified. Comments on each factor are shown below:

Factor	Level of Confidence
. migration	C.S.L.T. records.
. immigration	C.S.L.T. records.
. occupational shift	Alberta Branch, C.S.L.T. estimate of a 20 year working life.
. training output	Registrars at N.A.I.T., S.A.I.T. and University of Alberta. Due to the length of the training programs, the first graduates to affect the manpower stock will not appear until 1984. Therefore, our recommendations focus on the period 1984 to 2000.
. attrition	Since an age distribution of members was not available, 1% of stock was selected as a reasonable attrition rate.

o Estimating Requirements

. Historical Ratio

The current ratio of medical laboratory technologists to population of 1:990 was used to project the number of technologists required in the future to maintain the current level of manpower. This method of calculation was used as the selected scenario as it is the most accurate available.

TABLE XIV.2.3: MANPOWER REQUIREMENTS

PROVINCE: ALBERTA

OCCUPATION: MEDICAL LABORATORY TECHNOLOGISTS

PROJECTED MANPOWER REQUIREMENTS

YEAR	PROJECTED STOCK	POPULATION RATIO 1:990 MEDIUM POPULATION
1981	2,144	2,176
NET		32
1982	2,184	2,260
NET		76
1983	2,222	2,349
NET		127
1984	2,260	2,433
NET		173
1985	2,291	2,506
NET		215
1990	2,458	2,856
NET		398
1995	2,606	3,192
NET		586
2000	2,735	3,520
NET		785

- Utilization Method

  The proportion of 85,655 services per technologist was used to project the number of medical laboratory technologists required to maintain the current level of service into the future. However, since the data did not include private laboratories, and since it was not age/sex sensitive, it was not the preferred method of calculation.

o Net Manpower Requirements

The net manpower requirements under the most likely scenario are shown in Table XIV.2.3, opposite. The most likely scenario is based on the population ratio under the medium population projection. On the basis of this analysis, there is an immediate requirement for medical laboratory technologists each year during the forecast period.

Table XIV.3.1

Province: SASKATCHEWAN
Occupation: MED LAB TECHNOLOGISTS

Year	Number of Practitioners	Population to Manpower
1973	567	1: 1600
1974	597	1: 1520
1975	653	1: 1405
1976	681	1: 1353
1977	627	1: 1500
1978	726	1: 1300
1979	747	1: 1280
1980	777	1: 1240

Source:

C.S.L.T. IS CANADIAN SOCIETY OF LABORATORY TECHNOLOGISTS

Table XIV.3.2

Factors Affecting Manpower Supply

Province: SASKATCHEWAN
Occupation: MED LAB TECHNOLOGISTS

Factor	Assumption	Source
Opening Stock	777	C.S.L.T.[2]
Net Migration	-3.4% of stock	C.S.L.T.
Net Immigration	-3 for all years	C.S.L.T.
Net Occupational Shift[1]	-5% of stock	S.C.S.L.T.[3]
Training Output	80 for all years	DEPT. OF EDUCATION ESTIMATE
Attrition	-1% of opening stock	

Notes:

[1] Includes Active/Inactive Flows

[2] C.S.L.T. IS CANADIAN SOCIETY OF LABORATORY TECHNOLOGISTS

[3] S.C.S.L.T. IS SASKATCHEWAN BRANCH OF CANADIAN SOCIETY OF LABORATORY TECHNOLOGISTS

SASKATCHEWAN

a) Legal Controls

There is no legislation controlling the right of medical laboratory technologists to practice in Saskatchewan.

b) Assumptions

o Manpower Stock

Table XIV.3.1, opposite, shows the approximate total of medical laboratory technologists in the Province. The 1980 figure excludes those technologists who are working in other occupations or in the combined x-ray/medical laboratory technician occupation. The figure for each year has been inflated based on the estimate of 95% C.S.L.T. membership by the Saskatchewan Branch of the Canadian Society of Laboratory Technologists. For the purposes of this study, it has been assumed that the technologists are working full-time. Since age distribution information was not available, a percentage of stock has been selected to represent a reasonable attrition rate within the occupation.

o Factors Affecting Manpower Supply

Table XIV.3.2, opposite, shows the assumptions made with respect to each of the factors which potentially affect the manpower stock. For each assumption, the source of information has been identified. Comments on each factor are shown below:

Factor	Level of Confidence
. migration	C.S.L.T. records.
. immigration	C.S.L.T. records.
. occupational shift	Saskatchewan Branch, C.S.L.T. estimate of a 20 year working life.
. training output	Ministry of Education. Due to the length of the training programs, the first graduates to affect the manpower stock will not appear until 1984. Therefore, our recommendations focus on the period 1984 to 2000.
. attrition	Since an age distribution of members was unavailable, 1% of stock was selected as a reasonable attrition rate.

o Estimating Requirements

. Historical Ratio

The current ratio of medical laboratory technologists to population of 1:1,240 was used to project the number of technologists required in the future to maintain the current level of manpower. This method of calculation is the selected scenario as it is the most accurate available.

TABLE XIV.3.3: MANPOWER REQUIREMENTS

PROVINCE: SASKATCHEWAN

OCCUPATION: MEDICAL LABORATORY TECHNOLOGISTS

PROJECTED MANPOWER REQUIREMENTS

YEAR	PROJECTED STOCK	POPULATION RATIO 1:1,241 MEDIUM POPULATION
1981	789	787
NET		-2
1982	792	798
NET		6
1983	794	810
NET		16
1984	796	822
NET		26
1985	798	834
NET		36
1990	808	891
NET		83
1995	810	942
NET		132
2000	810	989
NET		179

- Utilization Method

  The proportion of 103,578 services per technologist was used to project the number of medical laboratory technologists required to maintain the current level of service into the future. However, since the data did not include private laboratories, and since it was not age/sex sensitive, it was not the preferred method of calculation.

o Net Manpower Requirements

The net manpower requirements under the most likely scenario are shown in Table XIV.3.3, opposite. The most likely scenario is based on the population ratio under the medium population projection. On the basis of this analysis, there is a small requirement for medical laboratory technologists during the forecast period.

Table XIV.4.1

Province: MANITOBA
Occupation: MED LAB TECHNOLOGISTS

Year	Number of Practitioners	Population to Manpower
1974	650	1: 1560
1975	699	1: 1460
1976	723	1: 1410
1977	765	1: 1350
1978	779	1: 1330
1979	807	1: 1300
1980	818	1: 1290

Source:

C.S.L.T. IS CANADIAN SOCIETY OF LABORATORY TECHNOLOGISTS

MANITOBA

a) Legal Controls

There is no legislation controlling the right of medical laboratory technologists to practice in Manitoba.

b) Assumptions

o Manpower Stock

The approximate total of medical laboratory technologists in the Province is shown in Table XIV.4.1, opposite. The 1980 figure excludes those technologists who are working in other occupations or in the combined x-ray/medical laboratory technician occupation. There is no provincial branch of the Canadian Society of Laboratory Technologists (C.S.L.T.) so an estimate of C.S.L.T. membership could not be obtained. Since the Saskatchewan Branch of C.S.L.T. estimated almost 100% membership, the figures obtained for Manitoba have not been altered. If there are technologists in Manitoba in addition to those registered with C.S.L.T., then the manpower requirement for technologists would be reduced.

For the purposes of this study, it has been assumed that the technologists are working full-time. Since age distribution information was not available, a percentage of stock has been selected to represent a reasonable attrition rate within the occupation.

Table XIV.4.2

Factors Affecting Manpower Supply

Province: MANITOBA
Occupation: MED LAB TECHNOLOGISTS

Factor	Assumption	Source
Opening Stock	818	C.S.L.T.[2]
Net Migration	-2.5% of stock	C.S.L.T.
Net Immigration	-2 for all years	C.S.L.T.
Net Occupational Shift[1]	-5% of stock	ESTIMATE
Training Output	55 for all years	RED RIVER[3]
Attrition	-1% of opening stock	ESTIMATE

Notes:

[1] Includes Active/Inactive Flows

[2] C.S.L.T. IS CANADIAN SOCIETY OF LABORATORY TECHNOLOGISTS

[3] RED RIVER IS REGISTRAR RED RIVER COMMUNITY COLLEGE

o Factors Affecting Manpower Supply

Table XIV.4.2, opposite, shows the assumptions made with respect to each of the factors which potentially affect the manpower stock. For each assumption, the source of information has been identified. Comments on each factor are shown below:

Factor	Level of Confidence
• migration	C.S.L.T. records.
• immigration	C.S.L.T. records.
• occupational shift	A 20 year working life was selected to be consistent with the other western provinces.
• training output	Registrar, Red River Community College. Due to the length of the training program, the first graduates to affect the manpower stock will not appear until 1984. Therefore, our recommendations focus on the period 1984 to 2000.
• attrition	Since an age distribution of members was unavailable, 1% of stock was selected as a reasonable attrition rate.

TABLE XIV.4.3: MANPOWER REQUIREMENTS

PROVINCE: MANITOBA

OCCUPATION: MEDICAL LABORATORY TECHNOLOGISTS

PROJECTED MANPOWER REQUIREMENTS

YEAR	PROJECTED STOCK	POPULATION RATIO 1:1,289 MEDIUM POPULATION
1981	802	824
NET		22
1982	787	829
NET		42
1983	773	834
NET		61
1984	760	839
NET		79
1985	748	845
NET		97
1990	705	873
NET		168
1995	676	896
NET		220
2000	655	915
NET		261

o **Estimating Requirements**

. Historical Ratio

The current ratio of medical laboratory technologists to population of 1:1,290 was used to project the number of technologists required in the future to maintain the current level of manpower. This method of calculation was used as the selected scenario as it is the most accurate available.

. Utilization Method

The proportion of 67,791 services per technologist was used to project the number of medical laboratory technologists required to maintain the current level of service into the future. However, since the data did not include private laboratories, and since it was not age/sex sensitive, it was not the preferred method of calculation.

o **Net Manpower Requirements**

The net manpower requirements under the most likely scenario are shown in Table XIV.4.3, opposite. The most likely scenario is based on the population ratio under the medium population projection. On the basis of this analysis, there is a small requirement for medical laboratory technologists during the forecast period.

APPENDIX IV - BIBLIOGRAPHY

MEDICAL LABORATORY TECHNOLOGISTS

BIBLIOGRAPHY

Alberta Career Resources Branch, Advanced Education and Manpower. Occupational Profiles - Medical Laboratory Technologist. Edmonton: October 1979.

Alberta Social Services and Community Health, Alberta Health & Social Services Disciplines Committee, Research and Planning Division. Health and Social Services Manpower in Alberta, 1979. Edmonton.

----------. September 30, 1980 Survey of Major Employers of Health and Social Service Personnel in Alberta. Edmonton: February 1981.

British Columbia, Province of, Ministry of Education, Task Force Report on Technological Training in Engineering, Health Science and Related Fields. Victoria: May 1981.

Canadian Society of Laboratory Technologists. Annual Reports, 1971 to 1980.

Chong-Kit, Dr. R. Summary of Results of Survey of Medical Laboratory Technologists in British Columbia. January 1981.

Manitoba, Province of, Department of Education, Program Development and Evaluation. 1980 Manitoba Community Colleges Follow-Up Survey. Winnipeg: 1981.

Manitoba, Province of, Departments of Health and Community Services, Research Section, Barbara Miller. Health Manpower Provincial Report, Manitoba 1979. Winnipeg: 1979.

Ontario, Province of, Department of Health. Manpower Provincial Report. Toronto.

Saskatchewan, Province of, Department of Health, Policy Research and Management Services Branch. Saskatchewan Health Manpower Annual Report - 1978. Regina.

Toronto Institute of Medical Technology, Laboratory Technology Division. Laboratory Manpower Study - 1976. Toronto: 1976.

University of British Columbia, Division of Health Services Research and Development, Health Sciences Centre. Production 79 -- A Status Report on the Production of Health and Human Services Personnel in the Province of British Columbia. Vancouver: 1980.

----------. Rollcall 79. Vancouver: 1980.

----------. Likely Demand for Medical Laboratory Technologists in the Period 1979-1984. Vancouver: March 1979.

Province of
British Columbia

Province of
Alberta

Province of
Saskatchewan

Province of
Manitoba

WESTERN CANADA
HEALTH MANPOWER TRAINING STUDY

Category # 3 Report XV
OCCUPATIONAL THERAPISTS

REPORT XV

OCCUPATIONAL THERAPISTS

THE REQUIREMENT FOR ALTERNATIVE TRAINING AND FUNDING ARRANGEMENTS IN WESTERN CANADA

REPORT XV

OCCUPATIONAL THERAPISTS

TABLE OF CONTENTS

PAGE

I. INTRODUCTION

Study Background....1
Study Objectives....1
Study Approach....2
Occupation Definition....4

II. TRAINING NEEDS IN WESTERN CANADA

Manpower Requirements....5
Existing Training Program....8
Occupational Issues....8

III. TRAINING RESPONSES

Decision Process....11
Timing and Location of Manpower Requirements....11
Indicated Manpower Responses....13

IV. RECOMMENDATIONS....18

APPENDIX I - Study Approach and Methodology
APPENDIX II - Provincial Net Manpower Requirement
APPENDIX III - Scope of Practice
APPENDIX IV - Bibliography

I. INTRODUCTION

STUDY BACKGROUND

The provision of effective health services to the community is, to a considerable degree, dependent on three essential resources:

- an adequate supply of well-trained specialist staff in each health occupation group
- the development of adequate facilities to service the community
- the availability of adequate funds to ensure cost-effective and efficient health services.

The range and complexity of health treatment programs has expanded greatly in Canada during the last twenty-five years. In addition, changing technology and the development of new treatment programs have resulted in an increased requirement for skilled, adequately trained health manpower. These factors have resulted in an increased emphasis on manpower planning and skill training for health occupations to ensure an adequate supply of trained practitioners to meet defined manpower requirements.

STUDY OBJECTIVES

The Western Canada Health Manpower Training Study was initiated by the western Premiers at their annual conference in 1980. The study terms of reference contain two major objectives. These are:

- to assess the existing and future needs for health manpower training programs and facilities in western Canada

- to make recommendations for the rationalization of the location and funding of health manpower training programs and facilities in western Canada.

STUDY APPROACH

The study was under the direction of a Steering Committee consisting of health and education representatives from the Provinces of British Columbia, Alberta, Saskatchewan and Manitoba. The study took place over two years and consisted of a review of 26 health occupations grouped into five categories. Each occupation has been studied separately, and a report has been produced for each. In addition, a report examining the inter-relations of the occupations has been submitted to the Steering Committee.

Data was collected from provincial and national associations and from government agencies for each of the occupations on the numbers of individuals registered with the associations and their current status as active or inactive practitioners. An attempt was also made to gather data on historical trends, the number of graduates from training, trends in movement of active practitioners to inactive status, occupational shifts out of the profession, trends in migration to and from other provinces, and immigration and emigration.

In the cases where validated and reliable information was not available, association spokesmen, employers and individuals in each of the occupations were interviewed to provide qualitative opinions regarding present and future trends affecting the manpower supply and requirement.

A literature review was conducted to examine the problems facing the occupation. A bibliography of the material reviewed is contained in Appendix D.

A health manpower computer model was developed to assist in the preparation of projections on the future supply and requirement for each occupation. A critical analysis of these twenty-year projections was then undertaken to develop the various supply and requirement scenarios presented in this report.

Separate documents describing the manpower planning methodology and the training decision-making process were issued. A brief summary of the overall study approach and methodology is set out in Appendix I, and details of the provincial net requirements are set out in Appendix II.

OCCUPATION DEFINITION

This report addresses the need for training programs for occupational therapists in each of the four provinces. For the purpose of this study, an occupational therapist is defined as an individual who:

"plans and carries out treatment programs based on activities such as work, education and recreation to rehabilitate physically and mentally disabled persons. Administers tests and observes patients to assess their emotional, mental and physical capacities. Plans and directs programs in manual and creative arts, industrial and vocational skills, recreational activities, remedial games, cultural and educational interests and play activities for children. Conducts group programs to assist patients in building self-confidence and in adjusting to family and community. Trains handicapped patients in self-care and daily living activities. Advises and instructs patients on specially-adapted household equipment and furnishings. Assesses patient's vocational potential and provides work adjustment and actual work experience. Participates in testing and training of patients with perceptual motor problems and provide training for children with learning disabilities. Records patient's activities, response and progress. Attends meetings of rehabilitation team and seminars, workshops and courses on occupational therapy. Supervises and instructs occupational-therapy students and auxiliary personnel assigned to department."[1]

1. Canadian Classification and Dictionary of Occupations, No. 3137-, 1980 Revision.

EXHIBIT 1

NET MANPOWER REQUIREMENTS: WESTERN CANADA REGION BY ALTERNATIVE SCENARIO - OCCUPATIONAL THERAPISTS

YEAR	PROJECTED STOCK	PROJECTED REQUIREMENT		
		POPULATION RATIO[1]	SERVICE TARGET RATIO[2]	SERVICE TARGET RATIO[3]
1981	719	720	979	901
		Net 1	260	182
1982	740	736	1,001	922
		Net -4	261	182
1983	757	753	1,025	942
		Net -4	268	185
1984	776	770	1,048	963
		Net 6	272	187
1985	789	785	1,069	982
		Net -4	280	193
1990	869	862	1,370	1,237
		Net 7	501	368
1995	985	932	1,779	1,579
		Net -53	794	594
2000	1,059	997	2,380	1,961
		Net -62	1,321	902

NOTE: 1- Population Ratio

British Columbia	1:8,802
Alberta	1:9,337
Saskatchewan	1:20,529
Manitoba	1:7,752

2- Service Target Ratio

1981-85	1:7,000
1986-90	1:6,000
1991-95	1:5,000
1996-2000	1:4,000

3- Service Target Ratio

	British Columbia, Alberta, Saskatchewan	Manitoba
1981-85	1:8,000	1:6,000
1986-90	1:7,000	1:5,000
1991-95	1:6,000	1:4,000
1996-2000	1:5,000	1:4,000

II. TRAINING NEEDS IN WESTERN CANADA

This section presents the statistical data for manpower requirements for western Canada, reviews the basis for projection and the confidence in basic data, existing training programs for occupational therapists, and reviews the major issues influencing the occupation.

MANPOWER REQUIREMENTS

Exhibit 1, opposite, shows the projected stock and requirement under three different scenarios for occupational therapists in western Canada during the period 1981 - 2000.

Methodology

Three scenarios have been established using different approaches to determine manpower requirements. The first uses a constant 1980 provincial population ratio approach for each of the western provinces. This approach assumes that each of the provinces will require the same number of occupational therapists per population as was determined in 1980. Using this approach, the net manpower situation for occupational therapists in western Canada indicates a surplus of 62 occupational therapists by the year 2000.

The second approach used to determine requirements is an incremental service target ratio. This approach identifies a service target ratio to be reached by the year 2000. It recognizes the difference between the current population ratio and the service target ratio and establishes reasonable incremented target ratios for each five year period.

The second scenario is determined on a service target ratio of 1:4,000 to be reached by the year 2000. The yearly requirements are incremented using the following ratios:

1981 - 1985	1:7,000
1986 - 1990	1:6,000
1991 - 1995	1:5,000
1996 - 2000	1:4,000

These incremental levels are applied to each of the western provinces. Under this scenario 1,321 additional occupation therapists are required by the year 2000. Achieving a ratio of 1:4000 by the year 2000 would require policy makers to identify a high priority for occupational therapists in the health care delivery system. (The basis for this service target ratio is discussed in more detail in Appendix II.)

A third scenario has been developed using an incremental service target ratio approach and considering the current situation in each of the western provinces and determining a reasonable goal on this basis. This scenario identifies a reasonable service target of 1:5,000 for the provinces of British Columbia, Alberta and Saskatchewan. The yearly requirements are incremented using the following ratios:

1981 - 1985	1:8,000
1986 - 1990	1:7,000
1991 - 1995	1:6,000
1996 - 2000	1:5,000

The province of Manitoba has established a different utilization pattern for occupational therapists, therefore, the service target of 1:4,000 is a reasonable goal to achieve in Manitoba. The yearly requirements for Manitoba are incremented using the following ratios:

1981 - 1985	1:6,000
1986 - 1990	1:5,000
1991 - 1995	1:4,000
1996 - 2000	1:4,000

Under this third scenario there is a requirement for 902 additional occupational therapists in western Canada by the year 2000. (The basis for this approach is discussed in more detail in Appendix II.)

This third scenario identifying the service target ratio of 1:5,000 for British Columbia, Alberta and Saskatchewan and 1:4,000 for Manitoba is determined as the most likely scenario reflecting the need for occupational therapists in western Canada by the year 2000.

Training recommendations for this scenario were developed to reach a relative balance between the supply and requirement of occupational therapists by the year 2000. The ability to reach this balance is, however, largely dependent on the availability and level of government budgetary allocations and the priority of attaining this level of occupational therapy services.

Degree of Confidence in Data

The projected stock has been developed on the basis of historical patterns and estimates of immigration, migration and occupational shift, current and projected levels of training and projected attrition from retirement at the age of 65.

Table 1

Occupational Therapy Programs in Western Canada Average Number of Enrolments and Graduates		
Province and Institutions	Enrolments	Graduates
British Columbia University of British Columbia	20	13 (1981-1986) 18 (1987-2000)
Alberta University of Alberta	30	26
Manitoba University of Manitoba	20	17
Western Canada Total:	70	56 (1981-1986) 61 (1987-2000)

The information for these projections has been derived from association records and estimates, and government data. In general, the information contained in these records has a reasonable level of accuracy and the projections for occupational therapists are considered to be acceptable.

EXISTING TRAINING PROGRAMS

Table 1, opposite, shows the location of, and the average number of graduates for the three training programs in western Canada which graduate occupational therapists. These programs will graduate approximately 56 students a year between 1981 - 1986, and 61 students a year after 1986.

British Columbia has traditionally had a combined physical and occupational therapy program. It is planned to split this combined program into two programs, one in occupational therapy and one in physical therapy. These changes are planned to occur in 1982. The projections for this study are based on the assumption that there will be two separate programs by the year 1982. The number of students graduating from the new occupational therapy program is expected to be 18.

The province of Saskatchewan has approximately 8 bursaries a year available to students pursuing studies in occupational therary.

OCCUPATIONAL ISSUES

The supply and requirements for occupational therapists in western Canada are influenced by a number of general trends and issues. These are:

Historical and Current Trends:

- **Developing Role**

The role of occupational therapists has become more defined in recent years. As a result, the level of awareness in occupation has been raised, and there is an increased demand for occupational therapy services within the health care system.

The increased emphasis in the health care system for out-patient services, home care and extended care is considered to increase the requirement for occupational therapists.

A growing elderly population increases the demand for occupational therapy services.

- **Part-Time Work**

Occupational therapy is primarily a female occupation and there has been a trend in the profession towards part-time work. Some provinces experience up to 30% of the occupational therapists working part-time. The actual requirement for occupational therapists is greater if the ratios between part-time and full time participation are taken into consideration. There is no clear indication, however, that this trend to increased part-time will continue in the future.

- **Labour Turnover**

Occupational therapists typically have a short working life of five years or less. This trend is changing to a longer

working life of between 8 to 12 years. This extended participation in the workforce will potentially reduce the requirement for additional occupational therapists.

Situations Likely to Occur with Major Policy Changes

- Input Substitution - Aides

Different levels of occupational therapy manpower are recognized with different qualification requirements. These include the occupational therapist, occupational therapy assistant and occupational therapy aide. In the western provinces none of these levels do not formally exists. Should the health care system within the western provinces formally recognize, train, and take steps to utilize the different levels of occupational therapy services, the requirement for qualified occupational therapists may be reduced.

- Input Substitution - Alternative Occupations

In western Canada, there is a trend to augment the services of occupational therapists in extended care facilities, and community programs with other professionals such as recreation therapists, or community workers. Should this trend in the health care system increase, the occupational therapist may be used in more of a consultative role. As a result, the requirement for occupational therapists may not increase to the extent forecasted under the current situation.

EXHIBIT 2

NET MANPOWER REQUIREMENTS BY PROVINCE

OCCUPATIONAL THERAPISTS

YEAR	BRITISH COLUMBIA		ALBERTA		SASKATCHEWAN		MANITOBA	
	POPULATION RATIO[1]	SERVICE TARGET[2]	POPULATION RATIO[1]	SERVICE TARGET[2]	POPULATION RATIO[1]	SERVICE TARGET[2]	POPULATION RATIO[1]	SERVICE TARGET[2]
1981	14	44	-6	32	0	74	-7	32
1982	26	57	-12	27	-4	71	-14	26
1983	38	70	-17	24	-4	72	-21	19
1984	50	82	-21	22	-7	80	-28	13
1985	61	94	-24	20	-7	72	-34	7
1990	91	183	-22	68	-12	92	-54	25
1995	94	275	-24	142	-19	119	-82	58
2000	100	421	-44	279	-25	160	-101	42

NOTE: 1- POPULATION RATIOS

British Columbia	1:8,802
Alberta	1:9,337
Saskatchewan	1:20,529
Manitoba	1:7,752

2- SERVICE TARGET RATIO

	British Columbia Alberta Saskatchewan	Manitoba
1981-85	1:8,000	1:6,000
1986-90	1:7,000	1:5,000
1991-95	1:6,000	1:4,000
1996-2000	1:5,000	1:4,000

III - TRAINING RESPONSES

DECISION PROCESS

The decision process outlined in Appendix I and discussed in detail in Report C, "A Decision Process To Evaluate The Location of, and Funding Arrangements For Health Occupation Training Programs in Western Canada", was used to evaluate the training implications of the net manpower requirements for occupational therapists discussed above. This section contains the results of this analysis.

TIMING AND LOCATION OF MANPOWER REQUIREMENTS

Exhibit 2, opposite, shows the projected net manpower requirements for occupational therapists in each of the western provinces for the period 1981 - 2000. The projections are developed on both a constant 1980 provincial population ratio and a service target ratio developed on incremented yearly requirements. The most likely scenario for occupational therapists has been determined using the incremented service target ratio requirement approach.

The service target ratio of 1:5,000 was determined as a reasonable goal for the provinces of British Columbia, Alberta and Saskatchewan. The annual requirement for each of these provinces have been developed using incremented levels starting at 1:7,000 from 1981 and increasing by 1,000 for each five year period to reach the ratio of 1:5,000 between 1995 -2000.

The service target ratio of 1:4,000 was identified as a reasonable goal for Manitoba. The annual requirements are shown at incremented levels beginning with 1:6,000 for 1981-85, and increasing by 1,000 each following five year period to reach the ratio of 1:4,000 during the period 1990 - 2000.

British Columbia

Using the 1980 population ratio, British Columbia will develop a requirement for 91 occupational therapists by 1990 and this requirement will increase to 108 by the year 2000. This averages to an annual requirement for approximately 5 additional occupational therapists over a 20 year period. This estimate is based on the assumption that the majority of graduates from the occupational therapy program will enter the British Columbia labour market. The net manpower requirement under the incremented service target ratio approach will increase to 421 occupational therapists by the year 2000, or an average annual requirement of 21 occupational therapists over a 20 year period.

Alberta

In Alberta, under the current 1980 population ratio, there will be a surplus of 44 occupational therapists by the year 2000. This approximates to an average annual surplus of 2 occupational therapists a year to the year 2000. Under the incremented service target ratio there will be a requirement for 279 occupational therapists by the year 2000. This averages to a net annual requirement for 14 occupational therapists a year. The supply projections for both approaches are based on the assumption that the majority of graduates from the occupational therapy program in Alberta will enter the Alberta labour market.

Saskatchewan

In Saskatchewan, the 1980 population ratio approach identifies a surplus of 25 occupational therapists by the year 2000. Under the incremented service target approach this surplus becomes a requirement for 160 occupational therapists by the year 2000, or an average annual requirement for 8 occupational therapists.

Manitoba

In Manitoba, there will be a surplus of 101 occupational therapists over the 20 year period based on the 1980 population ratio approach. This surplus changes to a requirement for 42 occupational therapists under the incremented service target ratio approach. The supply projection for both approaches are based on the assumption that the majority of graduates from the occupational therapy program in Manitoba will enter the Manitoba labour market.

INDICATED MANPOWER RESPONSE

Given the indicated requirement for additional occupational therapists in western Canada, training is seen as an appropriate strategy to increase the supply of occupational therapists.

British Columbia

British Columbia has traditionally received substantial numbers of occupational therapists from immigration. This situation changed in the mid 1970s, however, when the rate of immigration decreased. Training for occupational therapists in British Columbia has been through a combined physiotherapy and occupational therapy program. In this program, there has been a tendency for more students to enter the physiotherapy specialty.

Historically, the number of new graduates a year in occupational therapy averaged approximately 13 a year. With the development of a separate occupational therapy program, in 1983 the number of occupational therapy graduates is expected to increase to 18. Even with this increase, however, the supply of occupational therapists in British Columbia will not meet the increasing manpower requirements.

In order to meet the projected manpower requirements under the service target approved, it is necessary to more than double planned enrolments. An initial step for British Columbia would be to increase annual enrolment into the occupational therapy program to 40. The manpower situation for occupational therapists should be reassessed in 1987, to determine the need for further increases to this program or the possibility of alternative programs such as the accelerated training suggested by the University of Alberta.

Alberta

In Alberta the concept of an accelerated training program for occupational therapists has been developed by the University of Alberta to meet the immediate requirement for occupational therapists. If implemented, the program would require students entering to have a University degree. The students would receive approximately 2 years of additional training in occupational therapy. This approach to training is considered to be practical and provides a less expensive means of training occupational therapists in comparison with the traditional training program. If two accelerated training programs are implemented, with an enrolment of 40 students a year for a three year period, the province of Alberta would require a small increase in regular programs in occupational therapy to meet the projected manpower requirements by the year 2000. If the accelerated programs in Alberta are not introduced, an alternative would be to increase the enrolment in the current program by 20 places a year. Under the 1980 population ratio approach for occupational therapists, no increase in the number of occupational therapists graduating through training would be required.

The projected supply for occupational therapists assumes that the majority of students graduating enter the Alberta labour force. In actual fact this has not always been the case. Therefore recommendations include the need to study and initiate incentives to retain new occupational therapy graduates in Alberta.

Saskatchewan

Saskatchewan provides an average of 8 bursaries a year for students to pursue studies in occupational therapy. Formal training arrangements include 4 places in the University of Alberta Occupational Therapy program and plans for places in the Manitoba program. Traditionally, not all of the bursaries have been used. In addition, candidates from Saskatchewan have not always being accepted into the Alberta program because of the competition which exists with other applicants. The manpower situation for Saskatchewan under the most likely scenario establishes a need for 10 additional graduates a year to meet manpower requirements by the year 2000. This requirement supports the development of a training program in Saskatchewan with an enrolment of 20 students, based on the current situation in which 8 bursaries are granted per year and the projected requirement for 10 additional occupational therapists per year.

If out of province training is preferred, the University of Manitoba, Occupational Therapy program should be formally established as a main program providing training for both Saskatchewan and Manitoba. The size of the enrolment in the program would have to be doubled in order to meet the training requirement for Saskatchewan. The manpower response for Saskatchewan based on maintaining the 1980 population ratio does not indicate a need for an increase in the levels of training.

Manitoba

In Manitoba, the requirement for occupational therapists under the most likely scenario could be met through an increase of 5 enrolments a year. This is determined on the assumption that the majority of graduates from the program enter the Manitoba labour market. This has not always been the case in the past and consequently incentives to retain new graduates in Manitoba should be studied and implemented.

Occupational therapy programs require students to have clinical placements throughout their training. Various standards are put on facilities which have clinical placements available. Any increases in training for occupational therapists requires a proportionate increase in the number of clinical placements.

ALTERNATIVE LOCATIONS

The manpower strategy in Saskatchewan indicates the need to establish a training program in occupational therapy. The University of Saskatchewan is considered to be an appropriate location for the program if training in the province is determined as a priority. The University of Manitoba is an appropriate alternative location if out of province training is preferred.

With this alternative it would be appropriate for the Government of Saskatchewan to arrange for clinical placements to be located in Saskatchewan. The various standards and restrictions determined for clinical placements would have to be maintained. This situation would provide Saskatchewan students studying in Manitoba with the opportunity to gain experience and establish their profession within their own province.

Review of Funding Arrangements

If the University of Manitoba is seen as a preferable location for training Saskatchewan occupational therapists the province of Saskatchewan should enter a bilateral training agreement with the government of Manitoba. Specifically Saskatchewan should contract 20 places in the program and share the ongoing operational and administrative overhead costs of the University of Manitoba. Program development, start-up and capital costs would be excluded from these training agreements on the basis that the program is already in existence.

Defined Length of Training Agreement

If the province of Saskatchewan determines a preference to the establishment of a training agreement with the Government of Manitoba as the alternative to meeting the projected manpower requirement, the agreement should be for an initial five year period. Subsequent renewal options for additional five year periods should be included.

IV - RECOMMENDATIONS

Recommendations for each of the provinces are set out below.

British Columbia

.1- That the Occupational Therapy program at the University of British Columbia increase enrolments to accomodate 40 places a year.

.2- That in 1990 the Province of British Columbia reassess the manpower situation and determine the priority of reaching a service target ratio of 1:5,000 by the year 2000.

.3- That if determined a priority, the Province of British Columbia, increase the number of graduates from the University of British Columbia, Occupational Therapy program. This increase could be through either the regular training program or with the development of an accelerated training program.

Alberta

.4- The current program for occupational therapists in Alberta be increased by 5 places to accommodate an enrolment of 35 students.

.5- That an accelerated program be implemented for three years, starting in 1984, with an enrolment of 40 students.

.6- That an accelerated program be implemented for three years, starting in 1993, with an enrolment of 40 students.

Saskatchewan

.7- That with a priority for in-province training the Government of Saskatchewan establish a training program for occupational therapists and the program have an enrolment of 20 students.

.8- That with a priority for out of province training, the Government of Saskatchewan secure 20 places in the University of Manitoba, Occupational Therapy program.

.9- That the Province of Saskatchewan cancel the existing training agreement with Alberta.

.10- That the Government of Saskatchewan share in the ongoing operational and administrative overhead costs of the University of Manitoba, Occupational Therapy program based on the proportion of training places allocated.

.11- That the formal bilateral training agreements be negotiated between Manitoba and Saskatchewan for an initial period of five years with subsequent renewal options for additional five year periods.

.12- That the Government of Saskatchewan increase the number of bursaries available for studies in occupational therapy from 8 to 20.

Manitoba

.13- That the University of Manitoba increase the enrolment in the Occupational Therapy program by 5 places a year to meet its manpower requirement through training by the year 2000.

.14- That if out of province training is preferred for the province of Saskatchewan, the University of Manitoba increase the Occupational Therapy program by 25 places to accomodate an enrolment of 55 students.

.15- That the Government of Manitoba study and implement incentives to retain new graduates inside the provincial workforce.

APPENDIX I

STUDY APPROACH AND METHODOLOGY

STUDY APPROACH

Introduction

In order to achieve the study objectives, the work program consists of three key activities. These are:

- the analysis of manpower supply and requirements, and the calculation of net manpower requirements
- the analysis of existing training programs for Western Canada
- the development of recommendations for alternative training locations and funding arrangements

Analysis of Manpower Supply and Requirements

The analysis of manpower supply and requirements is designed to allow for a variety of data inputs, and for different emphasis depending on the occupation under review. A variety of data sources are used including provincial and national associations, health insurance agencies, and provincial health and education departments. In all instances, data is developed independently of previously published sources.

In addition to the basic projection of net manpower requirements, a number of sensitivity analyses have been completed to assess the impact of changed in the factors affecting supply and requirements, prior to developing recommendations for either additional training programs, or expanding existing training programs.

Approaches to Determining Manpower Requirements

The approach developed to determine manpower requirements uses three methods of projection. These are discussed below.

1. Service Utilization Approach

The utilization approach is based on an analysis of the pattern of health service usage. It establishes trends in service utilization and projects these onto future population estimates. There are three steps in the service utilization approach.

Step 1 - Determine Per Capita Utilization Rate

Historical data of the number of services provided, by age and sex of recipient is derived. The number of services per age/sex group is then divided by the population for group in the corresponding year. This results in a per capita utilization rate.

Step 2 - Project Future Service Required

The per capita utilization rate is projected onto the low, medium and high population for each year from 1981 to 2000. This results in an estimate of total future services.

Step 3 - Estimated Number of Practitioners Required

Having determined the total future services, the model projects the number of practitioners required, by assuming a constant level of services per practitioner. The number of services per practitioner is determined by dividing total services by the number of practitioners in the base year. To estimate the required number of practitioners, the model divides total future services required by the number of services per practitioner.

2. Service Target Ratio Approach

Service target ratios reflect a theorectical optimal manpower level required to meet health service requirements in the occupation under review. They are expressed as the ratio of practitioner to population. The service target ratios are derived based on discussion with health authorities, review of published reports, articles and summary of defined health care needs.

3. Population Ratio Approach

Population ratios are derived by dividing the total population at a specific point in time by the number of active practitioners. This results in a ratio of practitioners to population.

These ratios are analysed to determine if any trends exists. to project futuren manpower requirements, the model divides total projected population by the previously determined population ratio.

Summary of Approaches to Projecting Manpower Requirements

The three approaches outlined above have been used for the calculation of manpower requirements for this occupation. The specific application of each approach to this occupation is discussed under General Assumption, Appendix II, following.

Development of Recommendations for Alternative Training Locations and Funding Arrangements

We have developed a decision process to assist in developing recommendations for alternative training location(s) and funding arrangements. This process is designed to allow for the logical, consistent evaluation of a range of training alternatives.

There are seven steps in the decision process:

. Step 1. Analysis of manpower requirements

. Step 2. Identification of the appropriate type(s) of training

. Step 3. Definition of alternative training locations

. Step 4. Evaluation of alternative locations for new programs

. Step 5. Establishment of timing of training program requirement

. Step 6. Recommendation on training action(s) and location(s)

. Step 7. Recommendation on funding alternative(s)

LABOUR MARKET SUPPLY

Labour market supply is the relationship between the estimated number of practitioners registered with the provincial associations, the number of practitioners actually employed and the number of vacant positions. Vacancy survey data (normally collected by provincial governments) will identify the total number of budgeted positions, which is the total of the number currently employed plus vacancies.

Labour market supply is a useful tool to estimate, or determine the employment situation for each occupation. The current supply situation is expressed as total budgeted positions divided by the total number of registered practitioners. This percentage (%) of qualified practitioners who are currently employed will indicate the flexability of the existing labour market.

Typically the flexability of the labour market will reflect vacancy rates. The following table illustrates theoretical labour market situations:

"Tight" labour market - 90% - 95% of practitioners actively employed with a vacancy rate of 12% to 20%.

"Balanced" Labour Market - 80% - 90% of practitioners actively employed with a vacancy rate of 8% to 12%.

"Loose" Labour Market - 70% - 80% of practitioners actively employed with a vacancy rate of 0% to 8%.

APPENDIX II

PROVINCIAL NET MANPOWER REQUIREMENTS

Table XV.0.1

Number of Practitioners by Province in Western Canada

Occupation: OCC. THERAPY

Year	British Columbia[1]	Alberta[2]	Saskatchewan[3]	Manitoba[4]
1974	166	-	35	-
1975	269	-	39	108
1976	200	-	29	121
1977	297	176	51	127
1978	-	193	51	122
1979	-	222	48	126
1980	298	223	47	136

SOURCE:

1 DATA 1974 - 1977
DIVISION OF HEALTH SERVICES RESEARCH AND DEVELOPMENT, INFORMATION TAKEN FROM ROLL-CALL PUBLICATIONS. THE DATA FOR 1974 - 1977 INCLUDES DIFFERENT PROPORTIONS OF ACTIVE AND INACTIVE OCCUPATIONAL THERAPISTS

DATA 1980
ESTIMATES BASED ON, REPORT R:15, HEALTH MANPOWER RESEARCH UNIT (H.M.R.U.), DIVISION OF HEALTH SERVICES RESEARCH AND DEVELOPMENT, HEALTH SERVICES CENTRE, UNIVERSITY OF BRITISH COLUMBIA. THE DATA IS AN ESTIMATE OF ACTIVE OCCUPATIONAL THERAPISTS.

BRITISH COLUMBIA SOCIETY OF OCCUPATIONAL THERAPISTS (B.C.S.O.T.)

2 ALBERTA ASSOCIATION OF REGISTERED OCCUPATIONS THERAPISTS (A.A.R.O.T.). THE DATA IS AN ESTIMATE OF ACTIVE OCCUPATIONAL THERAPISTS.

3 SASKATCHEWAN SOCIETY OF OCCUPATIONAL THERAPISTS (S.S.O.T.). THE DATA IS AN ESTIMATE OF ACTIVE OCCUPATIONAL THERAPISTS.

4 ASSOCIATION OF OCCUPATIONAL THERAPISTS OF MANITOBA (A.O.T.M.). THE DATA IS AN ESTIMATE OF ACTIVE OCCUPATIONAL THERAPISTS.

Table XV.0.2

Factors Affecting Manpower Supply in Western Canada

Occupation: OCC. THERAPY

Factor	British Columbia	Alberta
Opening Stock	298	223
Net Migration	2 for all years	8 for all years
Net Immigration	3 for all years	0 for all years
Net Occupation Shift	-8% for 1981-1990 -6% for 1991-2000	-8% for 1981-1990 -6% for 1991-2000
Training Output	13 for 1981-1985 18 for 1986-2000	28 for all years
Attrition	Actual Retirement	Actual Retirement

	Saskatchewan	Manitoba
Opening Stock	47	136
Net Migration	-5 for odd years -2 for even years	0 for all years
Net Immigration	2 for all years	3 for all years
Net Occupation Shift	-8% for 1981-1990 -6% for 1991-2000	-8% for 1981-1990 -6% for 1991-2000
Training Output	8 for all years	17 for all years
Attrition	Actual Retirement	Actual Retirement

TABLE XV.0.3

AGE STRUCTURE - OCCUPATIONAL THERAPISTS

BY PROVINCE AND REGION

AGE GROUP	BRITISH COLUMBIA[1]	ALBERTA[1]	SASKATCHEWAN[1]	MANITOBA[2]	TOTAL #	TOTAL %
24 or less	25	28	19	12	84	9.9
25 - 29	95	122	38	46	301	35.3
30 - 34	101	103	5	41	250	29.6
35 - 39	57	27	-	11	95	11.1
40 - 44	22	13	-	5	40	4.7
45 - 49	15	16	-	6	37	4.0
50 - 54	7	15	-	5	27	3.2
55 - 59	7	2	-	1	10	1.2
60 - 64	3	1	-	1	5	0.6
65 & over	3	-	-	-	3	0.4
UNKNOWN	-	-	-	-	-	
TOTAL	335	327	62	128	852	

NOTE:

1 The age distr'butions are taken from association records and published government data. The totals include different proportions of active and inactive occupational therapists as determined from the records. The totals do not include the age distribution for occupational therapists not on record.

2 An estimate of Manitoba's age distribution was developed by projecting Alberta's age distribution onto Manitoba's active stock.

GENERAL ASSUMPTIONS

Manpower Stock

Table XV.0.1 opposite, illustrates the total number of active occupational therapists identified in each of the provinces in Western Canada.

Factors Affecting Manpower Supply

The assumptions made with respect to each of the factors which have the potential to affect manpower stock are shown opposite in Table XV.0.2. These factors include migration, immigration, training output, active/inactive movement and retirement through attrition. For each of these assumptions, the information source has been identified. Assumptions affecting manpower have been based on historical and current information along with projected trends.

The age distribution of physiotherapists is shown in Table XV.0.3. Information from the age distribution has been used to project the retirement of occupational therapists at the age of 65 years.

Estimating Requirements

o Historical Ratio

For each province, the current ratio of occupational therapists to population was used to project the number of practitioners required in the future to maintain to current level of manpower.

- Utilization

The utilization approach was not used to determine net manpower requirements for occupational therapists. Utilization data for occupational therapists is not age specific, therefore, it does not provide an accurate utilization pattern of services related to the changing proportion of population age groups.

- Service Target Ratio

An established service target ratio for occupational therapists has not been developed by health care professionals.

The requirement for occupational therapists is estimated to be developing to that equivalent for physiotherapists. The Canadian Medical Association indicates a service target ratio of 1 physiotherapist to 4,000 people.

The service target ratio of 1 occupational therapist to 4,000 population is seen as an optimum ratio. Factors contributing to this requirement include an increase in utilization of occupational therapy services in extended care, an increase proportion of elderly people to population and a recognized need for additional services to meet this segment of the population, along with the development of more out-patient services and a trend toward the formation of more home care programs.

The ratio of 1:4,000 creates a significant impact on net manpower requirements, as the majority of current population ratios are more than double this ratio. Taking this into consideration a target ratio of 1:5,000 has used in some situations as a more reasonable goal to work towards.

In working towards a service target ratio, incremented target levels for each five year period have been identified. Incremented levels provide a clearer perspective as to the actual net requirements throughout the period.

Sensitivity Analysis

Sensitivity analysis has been used on the requirement assumptions to determine the effect on net manpower requirements on occupational therapists. These include the analysis of the service target ratio of 1:5,000 and the use of incremented target ratios. The significance of these analysis are included throughout the report.

TABLE XV.1.1

PROVINCE: BRITISH COLUMBIA
OCCUPATION: OCC. THERAPY

YEAR	NUMBER OF PRACTITIONERS	POPULATION TO MANPOWER
1974	166	1:14427
1975	269	1: 9134
1976	200	1:12233
1977	297	1: 8396
1978	-	-
1979	-	-
1980	298	1: 8800

SOURCE:

DATA 1974 - 1977
DIVISION OF HEALTH SERVICES RESEARCH AND DEVELOPMENT, INFORMATION TAKEN FROM ROLL-CALL PUBLICATIONS. THE DATA FROM 1974 - 1977 INCLUDES DIFFERENT PROPORTIONS OF ACTIVE AND INACTIVE OCCUPATIONAL THERAPISTS.

DATA 1980
ESTIMATE BASED ON, REPORT R:15, HEALTH MANPOWER RESEARCH UNIT (H.M.R.U.), DIVISION OF HEALTH SERVICES RESEARCH AND DEVELOPMENT, HEALTH SERVICES CENTRE, UNIVERSITY OF BRITISH COLUMBIA.

BRITISH COLUMBIA SOCIETY OF OCCUPATIONAL THERAPISTS (B.C.S.O.T.).

Table XV.1.2

Factors Affecting Manpower Supply

Province: BRITISH COLUMBIA
Occupation: OCCUPATIONAL THERAPY

Factor	Assumption	Source
Opening Stock	298	H.M.R.U. & B.C.S.O.T.[2]
Net Migration	2 for all years	H.M.R.U. & B.C.S.O.T.[2]
Net Immigration	3 for all years	H.M.R.U. & B.C.S.O.T.[2]
Net Occupational Shift[1]	- 8% FOR 1981 - 1990 - 6% FOR 1991 - 2000	ESTIMATE[3]
Training Output	13 for 1981-1985 18 for 1986-2000	U.B.C.[4]
Attrition	Actual Retirement	H.M.R.U. & B.C.S.O.T.[2]

Notes:

[1] Includes Active/Inactive Flows

[2] ESTIMATE BASED ON REPORT R:15, HEALTH MANPOWER RESEARCH UNIT (H.M.R.U.), DIVISION OF HEALTH SERVICES AND DEVELOPMENT, HEALTH SERVICES CENTRE, UNIVERSITY OF BRITISH COLUMBIA

BRITISH COLUMBIA SOCIETY OF OCCUPATIONAL THERAPISTS (B.C.S.O.T.)

[3] ESTIMATE, DETERMINED FROM RECORDS ON ACTIVE TO INACTIVE MOVEMENT FROM THE ASSOCIATION OF OCCUPATIONAL THERAPISTS OF MANITOBA (A.O.T.M.)

[4] UNIVERSITY OF BRITISH COLUMBIA

TABLE XV.1.3

OCCUPATIONAL THERAPISTS IN BRITISH COLUMBIA BY AGE[1]

AGE GROUP	MALE	FEMALE	TOTAL
20 - 24	-	25	25
25 - 29	1	94	95
30 - 34	4	97	101
35 - 39	3	54	57
40 - 44	1	21	22
45 - 49	-	15	15
50 - 54	-	7	7
55 - 59	-	7	7
60 - 64	-	3	3
65 or over	-	3	3
UNKNOWN	-	-	-
TOTAL	9	326	335

Source: Estimate based on Report R:15, H.M.R.U.

NOTE:

1 The totals include different proportions of active and inactive occupational therapists as determined from records. The totals do not include the age distribution for occupational therapists not on record.

PROVINCIAL ASSUMPTIONS

BRITISH COLUMBIA

a) Legal Controls

There is no legislation controlling the right to practic.

b) Assumptions

Table XV.1.1 opposite, indicates the total number of occupational therapists in British Columbia identified as active.

- Factors Affecting Manpower Supply

The assumptions made with respect to each of the factors which have the potential to affect manpower supply are shown in Table XV.1.2 opposite. These factors include migration, immigration, active to inactive movements, training output and retirement. For each assumption, the information source has been identified. The age distribution for active occupational therapists is shown in Table XV.1.3.

- Confidence in Factors Affecting Manpower Supply

The assumptions made on manpower supply were developed from information published in Report R:15, from the Health Manpower Research Unit (HMRU), the University of British Columbia, and estimates made by the provincial association. The active stock includes the number of occupational therapists considered active in the association and a portion of occupational therapists active but not members of the association. No records are kept on movement patterns therefore estimates have been made on migration, immigration and movement to and

from inactive. The average movement between active to inactive is based on -8%. This movement has been determined from actual records available on occupational therapists in the province of Manitoba. A decrease to -6% after 1990 incorporates a trend towards longer participation in the workforce. The training figures assume the combined physiotherapy/occupational therapy program will be split in 1982. This is based on information obtained from the University of British Columbia. Specific age distributions for occupational therapy are not kept by the association therefore projections for retirement at the age of 65 were developed on information in the Report R:15 by the HMRU.

o Estimating Requirements

- Historical Ratio

The current ratio of occupational therapists to population is 1:8,802. It was used to project the number of occupational therapists required in the future to maintain the current level of manpower.

- Service Target Ratio

The service target ratio of 1:5,000 has been used to estimate requirements for occupational therapists in British Columbia. This ratio has been incremented at the following levels throughout the 20 year time period.

1981-85	1:8,000
1986-90	1:7,000
1991-95	1:6,000
1996-2000	1:5,000

TABLE XV.1.4: NET MANPOWER REQUIREMENTS

OCCUPATIONAL THERAPISTS - BRITISH COLUMBIA

YEAR	PROJECTED STOCK	PROJECTED REQUIREMENT		
		POPULATION RATIO[1]	SERVICE TARGET RATIO[2]	SERVICE TARGET RATIO[3]
1981	290	304	382	334
		NET 14	92	44
1982	284	310	389	341
		NET 26	105	57
1983	278	316	397	348
		NET 38	119	70
1984	273	323	405	355
		NET 50	132	82
1985	268	329	413	362
		NET 61	145	94
1990	269	360	528	452
		NET 91	259	183
1995	294	388	682	569
		NET 94	388	275
2000	304	412	907	725
		NET 108	603	421

NOTE: 1- Population Ratio 1:8,802

2- Service Target Ratio
- 1981-85 1:7,000
- 1986-90 1:6,000
- 1991-95 1:5,000
- 1996-2000 1:4,000

3- Service Target Ratio
- 1981-85 1:8,000
- 1986-90 1:7,000
- 1991-95 1:6,000
- 1996-2000 1:5,000

o Net Manpower Requirement

The net manpower requirements under each projection approach are shown in Table XV.1.4 opposite. The most likely scenario is based on a service target ratio of 1:5,000, under the medium population projection.

Table XV.2.1

Province: ALBERTA
Occupation: OCC. THERAPY

Year	Number of Practitioners	Population to Manpower
1977	176	1: 10780
1978	193	1: 10110
1979	222	1: 9090
1980	223	1: 9340

Source: ALBERTA ASSOCIATION OF OCCUPATIONAL THERAPISTS (A.A.O.T.)

THE DATA IS AN ESTIMATE OF ACTIVE OCCUPATIONAL THERAPISTS

Table XV.2.2

Factors Affecting Manpower Supply

Province: ALBERTA
Occupation: OCCUPATIONAL THERAPY

Factor	Assumption	Source
Opening Stock	223	A.A.O.T.[2]
Net Migration	8 for all years	A.A.O.T.[2]
Net Immigration	0 for all years	A.A.O.T.[2]
Net Occupational Shift[1]	-8% FOR 1981 - 1990 -6% FOR 1991 - 2000	ESTIMATE[3]
Training Output	28 for all years	U. OF A.[4]
Attrition	Actual Retirement	A.A.O.T.[2]

Notes:

[1] Includes Active/Inactive Flows

[2] ALBERTA ASSOCIATION OF OCCUPATIONAL THERAPISTS (A.A.O.T.)

[3] ESTIMATE, DETERMINED FROM RECORDS ON ACTIVE TO INACTIVE MOVEMENTS FROM THE ASSOCIATION OF OCCUPATIONAL THERAPISTS OF MANITOBA (A.O.T.M.)

[4] UNIVERSITY OF ALBERTA

TABLE XV.2.3

OCCUPATIONAL THERAPISTS IN ALBERTA BY AGE[1]

AGE GROUP	MALE	FEMALE	TOTAL
20 - 24	-	28	28
25 - 29	4	118	122
30 - 34	2	101	103
35 - 39	-	27	27
40 - 44	-	13	13
45 - 49	1	15	16
50 - 54	1	14	15
55 - 59	-	2	2
60 - 64	-	1	1
65 or over	1	1	2
UNKNOWN	-	-	-
TOTAL	9	320	329

Source: The Alberta Association of Registered Occupational Therapists.

NOTE:

1 The age distributions are taken from association records. The totals include different proportions of active and inactive occupational therapists as determined from the records. The total do not include the age distribution for occupational therapists not on record.

PROVINCIAL ASSUMPTIONS

ALBERTA

a) Legal Controls

There is no legislation controlling the right to practice.

b) Assumptions

Table XV.2.1, opposite, indicates the total number of occupational therapists in Alberta identified as active.

- Factors Affecting Manpower Supply

The assumptions made with respect to each of the factors which have the potential to affect manpower supply are shown in Table XV.2.2 opposite. These factors include migration, immigration, active to inactive movements, training output and retirement. For each assumption, the information source has been identified. The age distribution for active occupational therapists is shown in Table XV.2.3.

- Confidence in Factors Affecting Manpower Supply

The assumptions made on manpower supply were developed from estimates made by the association. The number of occupational therapists indicated as active in the association. No records are kept on movements from immigration, migration or active to inactive, therefore assumptions were developed on estimates. The active to inactive movement of -8% was used based on the movement determined from actual records in Manitoba and a decrease to -6% incorporating a trend towards longer participation in the workforce. The training figures were based

TABLE XV.2.4: NET MANPOWER REQUIREMENTS

OCCUPATIONAL THERAPISTS - ALBERTA

YEAR	PROJECTED STOCK	PROJECTED REQUIREMENT		
		POPULATION RATIO[1]	SERVICE TARGET RATIO[2]	SERVICE TARGET RATIO[3]
1981	237	231	307	269
		NET -6	70	32
1982	252	240	319	279
		NET -12	67	27
1983	266	249	332	290
		NET -17	66	24
1984	279	258	344	301
		NET -21	65	22
1985	290	266	354	310
		NET -24	64	20
1990	335	303	471	403
		NET -32	136	68
1995	384	338	632	526
		NET -46	248	142
2000	417	373	871	696
		NET -44	454	279

NOTE: 1- Population Ratio 1:9,337

2- Service Target Ratio
- 1981-85 1:7,000
- 1986-90 1:6,000
- 1991-95 1:5,000
- 1996-2000 1:4,000

3- Service Target Ratio
- 1981-85 1:8,000
- 1986-90 1:7,000
- 1991-95 1:6,000
- 1996-2000 1:5,000

on information from the University of Alberta. Specific age distributions were determined from association records. Retirement at 65 has been projected using this information.

- Estimating Requirements

  - Historical Ratio

    The current ratio of occupational therapists to population is 1:9,337. It was used to project the number of occupational therapists required in the future to maintain the current level of manpower.

  - Service Target Ratio

    The service target ratio of 1:5,000 has been used to estimate requirements for physiotherapists in Alberta. This ratio has been incremented at the following levels throughout the 20 year time period.

1981-85	1:8,000
1986-90	1:7,000
1991-95	1:6,000
1996-2000	1:5,000

- Net Manpower Requirement

The net manpower requirements under each projection approach are shown in Table XV.2.4, opposite. The most likely scenario is based on a service target ratio of 1:5,000, under the medium population projection.

Table XV.3.1

Province: SASKATCHEWAN
Occupation: OCC. THERAPY

Year	Number of Practitioners	Population to Manpower
1974	35	1: 25910
1975	39	1: 23540
1976	29	1: 31780
1977	51	1: 18380
1978	51	1: 18580
1979	48	1: 19910
1980	47	1: 20530

Source: SASKATCHEWAN SOCIETY OF OCCUPATIONAL THERAPISTS (S.S.O.T.)

THE DATA IS AN ESTIMATE OF ACTIVE OCCUPATIONAL THERAPISTS

Table XV.3.2

Factors Affecting Manpower Supply

Province: SASKATCHEWAN
Occupation: OCCUPATIONAL THERAPY

Factor	Assumption	Source
Opening Stock	47	S.S.O.T.[2]
Net Migration	-5 FOR ODD YEARS -2 FOR EVEN YEARS	S.S.O.T.[2]
Net Immigration	2 for all years	S.S.O.T.[2]
Net Occupational Shift[1]	-8% FOR 1981 - 1990 -6% FOR 1991 - 2000	ESTIMATE[3]
Training Output	8 for all years	GOVERNMENT OF SASKATCHEWAN[4]
Attrition	Actual Retirement	S.S.O.T.[2]

Notes:

[1] Includes Active/Inactive Flows

[2] SASKATCHEWAN SOCIETY OF OCCUPATIONAL THERAPISTS (S.S.O.T.)

[3] ESTIMATE, DETERMINED FROM RECORDS ON ACTIVE TO INACTIVE MOVEMENT FROM THE ASSOCIATION OF OCCUPATIONAL THERAPISTS OF MANITOBA (A.O.T.M.)

[4] GOVERNMENT OF SASKATCHEWAN, THE AVERAGE NUMBER OF BURSARIES GRANTED FOR STUDIES IN OCCUPATIONAL THERAPY

TABLE XV.3.3

OCCUPATIONAL THERAPISTS IN SASKATCHEWAN BY AGE[1]

AGE GROUP	MALE	FEMALE	TOTAL
20 - 24	-	19	19
25 - 29	2	36	38
30 - 34	-	5	5
35 - 39	-	-	-
40 - 44	-	-	-
45 - 49	-	-	-
50 - 54	-	-	-
55 - 59	-	-	-
60 - 64	-	-	-
65 or over	-	-	-
UNKNOWN	-	-	-
TOTAL	2	60	62

Source: The Saskatchewan Society of Occupational Therapists.

NOTE:

1 The age distributions are taken from association records. The totals include different proportions of active and inactive occupational therapists as determined from the records. The totals do not include the age distribution for occupational therapists not on record.

PROVINCIAL ASSUMPTIONS

SASKATCHEWAN

a) Legal Controls

The Registered Occupational Therapists Act (Chapter R-13) is the act regulating the practice of occupational therapists in the Province of Saskatchewan. The certification and licensing requirements are shown in Appendix III - Scope and Control of Practice.

b) Assumptions

Table XV.3.1, opposite, indicates the total number of occupational therapists in Saskatchewan identified as active.

- Factors Affecting Manpower Supply

The assumptions made with respect to each of the factors which have the potential to affect manpower supply are shown in Table XV.3.2 opposite. These factors include migration, immigration, active to inactive movements, training output and retirement. For each assumption, the information source has been identified. The age distribution for active occupational therapists is shown in Table XV.3.3.

- Confidence in Factors Affecting Manpower Supply

The assumptions made on manpower supply were developed from estimates made by the association. The active stock includes the number of occupational therapists indicated as active in the association. No records are kept on movements from immigration, migration or active to inactive, therefore assumptions were developed on estimates. The

TABLE XV.3.4: NET MANPOWER REQUIREMENTS

OCCUPATIONAL THERAPISTS - SASKATCHEWAN

YEAR	PROJECTED STOCK	PROJECTED REQUIREMENT		
		POPULATION RATIO[1]	SERVICE TARGET RATIO[2]	SERVICE TARGET RATIO[3]
1981	48	48	139	122
		0	91	74
1982	52	48	141	123
		-4	89	71
1983	53	49	143	125
		-4	90	72
1984	57	50	145	127
		-7	88	70
1985	57	50	147	129
		-7	90	72
1990	66	54	184	158
		-12	118	92
1995	76	57	234	195
		-19	158	119
2000	85	60	307	245
		-25	222	160

NOTE: 1- Population Ratio 1:20,529

2- Service Target Ratio
- 1981-85 1:7,000
- 1986-90 1:6,000
- 1991-95 1:5,000
- 1996-2000 1:4,000

3- Service Target Ratio
- 1981-85 1:8,000
- 1986-90 1:7,000
- 1991-95 1:6,000
- 1996-2000 1:5,000

active to inactive movement of -8% was used based on the movement determined from actual records in Manitoba and a decrease to -6% incorporating a trend towards longer participation in the workforce. The training figures were based on the average number of bursaries available for studies in occupational therapy. Specific age distributions are kept for occupational therapists by the association. Projections for retirement at 65 years of age were developed on this information.

- Estimating Requirements

  - Historical Ratio

    The current ratio of occupational therapists to population is 1:20,529. It was used to project the number of occupational therapists required in the future to maintain the current level of manpower.

  - Service Target Ratio

    The service target ratio of 1:5,000 has been used to estimate requirements for occupational therapists in Saskatchewan. This ratio has been incremented at the following levels throughout the 20 year time period.

1981-85	1:8,000
1986-90	1:7,000
1991-95	1:6,000
1996-2000	1:5,000

TABLE XV.3.4: NET MANPOWER REQUIREMENTS

OCCUPATIONAL THERAPISTS - SASKATCHEWAN

YEAR	PROJECTED STOCK	PROJECTED REQUIREMENT		
		POPULATION RATIO[1]	SERVICE TARGET RATIO[2]	SERVICE TARGET RATIO[3]
1981	48	48 0	139 91	122 74
1982	52	48 -4	141 89	123 71
1983	53	49 -4	143 90	125 72
1984	57	50 -7	145 88	127 80
1985	57	50 -7	147 90	129 72
1990	66	54 -12	184 118	158 92
1995	76	57 -19	234 158	195 119
2000	85	60 -25	307 222	245 160

NOTE: 1- Population Ratio 1:20,529

2- Service Target Ratio
- 1981-85 1:7,000
- 1986-90 1:6,000
- 1991-95 1:5,000
- 1996-2000 1:4,000

3- Service Target Ratio
- 1981-85 1:8,000
- 1986-90 1:7,000
- 1991-95 1:6,000
- 1996-2000 1:5,000

o **Net Manpower Requirement**

The net manpower requirements under each projection approach are shown in Table XV.3.4, opposite. The most likely scenario is based on a service target ratio of 1:5,000 under the medium population projection.

Table XV.4.1

Province: MANITOBA
Occupation: OCC. THERAPISTS

Year	Number of Practitioners	Population to Manpower
1975	108	1: 9430
1976	121	1: 8440
1977	127	1: 8100
1978	122	1: 8470
1979	126	1: 8310
1980	136	1: 7750

Source: ASSOCIATION OF OCCUPATIONAL THERAPISTS OF MANITOBA (A.O.T.M.)

THE DATA IS AN ESTIMATE OF ACTIVE OCCUPATIONAL THERAPISTS

Table XV.4.2

Factors Affecting Manpower Supply

Province: MANITOBA
Occupation: OCC. THERAPY

Factor	Assumption	Source
Opening Stock	136	A.O.T.M.[2]
Net Migration	0 for all years	A.O.T.M.
Net Immigration	3 for all years	A.O.T.M.
Net Occupational Shift[1]	-8% for 1981-1990 -6% for 1991-2000	A.O.T.M.
Training Output	17 for all years	U. OF M.[3]
Attrition	Actual Retirement	ESTIMATE[4]

Notes:

[1] Includes Active/Inactive Flows

[2] ASSOCIATION OF OCCUPATIONAL THERAPISTS OF MANITOBA (A.O.T.M.)

[3] UNIVERSITY OF MANITOBA

[4] ESTIMATE MADE FROM ALBERTA'S AGE DISTRIBUTION

TABLE XV.4.3

OCCUPATIONAL THERAPISTS IN MANITOBA BY AGE

AGE GROUP	MALE	FEMALE	TOTAL
20 - 24	-	-	12
25 - 29	-	-	46
30 - 34	-	-	41
35 - 39	-	-	11
40 - 44	-	-	5
45 - 49	-	-	6
50 - 54	-	-	5
55 - 59	-	-	1
60 - 64	-	-	1
65 or over	-	-	-
UNKNOWN	-	-	-
TOTAL	-	-	128

Source: Estimates made by projecting Alberta's age distribution onto Manitoba's active stock.

PROVINCIAL ASSUMPTIONS

MANITOBA

a) Legal Controls

The Occupational Therapists Act (S.M. 1971 Chapter 110) is the act regulating the practice of occupational therapists in the province of Manitoba. The certification and licensing requirements are shown in Appendix III - Scope and Control of Practice.

b) Assumptions

Table XV.4.1, opposite, indicates the total number of occupational therapists in Manitoba identified as active.

- Factors Affecting Manpower Supply

The assumptions made with respect to each of the factors which have the potential to affect manpower supply are shown in Table XV.4.2 opposite. These factors include migration, immigration, active to inactive movements, training output and retirement. For each assumption, the information source has been identified. The estimated age distribution for active occupational therapists is shown in Table XV.4.3.

- Confidence in Factors Affecting Manpower Supply

The assumptions made on manpower supply were developed from estimates made by the association. The active stock includes the number of occupational therapists indicated as active in the association. Some records are kept on movements from immigration, migration or active to inactive, therefore assumptions were developed on records along with

estimates. The active to inactive movement of -8% was used based on the movement determined from actual records over the last few years. A decrease to -6% incorporates a trend towards longer participation in the workforce. The training figures were based on information from the University of Manitoba. Specific age distributions, are not kept by the association, therefore projections for retirement at the age of 65 were based on estimates from the association, and projecting the proportions of Alberta's age distribution onto the Manitoba stock.

o Estimating Requirements

o Historical Ratio

The current ratio of occupational therapists to population is 1:7,752. It was used to project the number of occupational therapists required in the future to maintain the current level of manpower.

o Service Target Ratio

The service target ratio of 1:4,000 has been used to estimate requirements for occupational therapists in Manitoba. This recognizes the fact that Manitoba has traditionally established a unique utilization pattern for occupational therapists. This ratio has been incremented at the following levels throughout the 20 year time period.

1981-85	1:6,000
1986-90	1:5,000
1991-95	1:4,000
1996-2000	1:4,000

TABLE XV.4.4: NET MANPOWER REQUIREMENTS

OCCUPATIONAL THERAPISTS - MANITOBA

YEAR	PROJECTED STOCK	PROJECTED REQUIREMENT		
		POPULATION RATIO[1]	SERVICE TARGET RATIO[2]	SERVICE TARGET RATIO[3]
1981	144	137	151	176
		NET -7	7	32
1982	152	138	152	178
		NET -14	Ø	26
1983	160	139	153	179
		NET -21	7	19
1984	167	139	154	180
		NET -28	13	13
1985	174	140	155	181
		NET -34	19	7
1990	199	145	187	224
		NET -54	-12	25
1995	231	149	231	289
		NET -82	0	58
2000	253	152	295	295
		NET -101	42	42

NOTE: 1- Population Ratio 1:7,752

2- Service Target Ratio
- 1981-85 1:7,000
- 1986-90 1:6,000
- 1991-95 1:5,000
- 1996-2000 1:4,000

3- Service Target Ratio
- 1981-85 1:6,000
- 1986-90 1:5,000
- 1991-95 1:4,000
- 1996-2000 1:4,000

o **Net Manpower Requirement**

The net manpower requirements under each projection approach are shown in Table XV.4.4, opposite. The most likely scenario is based on a service target ratio of 1:4,000 under the medium population projection.

APPENDIX III - SCOPE OF PRACTICE

OCCUPATIONAL THERAPY: CONTROL OF PRACTICE

PROVINCE	CERTIFICATION/LICENSING/REGISTRATION		
	REQUIRED CHARACTERISTICS OF APPLICANTS	CERTIFICATION REQUIREMENTS	LICENSING REQUIREMENTS
Saskatchewan Chapter R-13			The Registered Occupational Therapists Act. Membership available to the persons who: . are eligible for certification by C.A.O.T.; or . hold a diploma or degree in occupational therapy from an educational institution approved by the executive and The University of Saskatchewan and who passes the examinations prescribed under this Act; or . is a member in good standing of any society or association or other body of occupational therapists that is approved by the executive and The University of Saskatchewan; or . if not engaged in the profession for five or more years, and have undergone a specified training period and criteria for C.A.O.T. requalification. . Occupational Therapists from outside Canada whose mother tongue is not English must prove their working knowledge of that language by taking the Tofel test and passing at the level of .550, or whatever CPA use, whichever is higher. Documentary proof must accompany their application for membership to S.S.O.T.

OCCUPATIONAL THERAPY: CONTROL OF PRACTICE

PROVINCE	CERTIFICATION/LICENSING/REGISTRATION		
	REQUIRED CHARACTERISTICS OF APPLICANTS	CERTIFICATION REQUIREMENTS	LICENSING REQUIREMENTS
Manitoba Chapter 110			The Occupational Therapists Act. Membership available to the person who: . is currently practising in the province; or . is a graduate of a school of occupational therapy approved by the board and has successfully completed all requirements of internship as prescribed by the board; or . has passed the examination prescribed by the board for occupational therapists; or . is a member in good standing of The Canadian Association of Occupational Therapists; or . has been registered and whose name has not been erased.

APPENDIX IV - BIBLIOGRAPHY

REPORTS

Canadian Association of Occupational Therapists, Guidelines for the Training of Occupational Therapy Assistants, March 1979.

Canadian Association of Occupational Therapists Accreditation Committee, Standards For the Education of Occupational Therapists in Canada, December 1974, (Revision, June 1980)

Cooper, J.E., Factors that Influence the Job Choice of Recent Graduates from a Program in Occupational Therapy, University of Manitoba, 1981.

Division of Health Services Research and Development, University of British Columbia, Occupational Therapy Manpower in British Columbia, 1979: Survey of Members of the E.C. Society of Occupational Therapists and of all other known Occupational Therapists in British Columbia, Report R:15, August 1980.

Maxwell, J.D.; and Maxwell, M.P., The final report of the Queens University Study of Occupational Therapy, Occupational Therapy: The Diffident Profession, Health and Welfare Canada, 606-1242-46, February 1978.

O'Shea, B.J., ed., Proceedings on Symposium on Occupational Therapy Service Delivery Patterns and Manpower Planning, October 18, 19, 20, 1978, Roehampton Place Hotel, Toronto, Ontario, Health and Welfare Canada (Project No. 6613-1129-50) and the Canadian Association of Occupational Therapists.

Saskatchewan Society of Occupational Therapists, Submission from the Saskatchewan Society of Occupational Therapists to the Minister of Public Health, Government of Saskatchewan, March 1975.

Saskatchewan Society of Occupational Therapists, Submission from the Saskatchewan Society of Occupational Therapists to the Provincial Department of Health's Public Task Force on Rehabilitation, January 1980.

Saskatchewan Society of Occupational Therapists, Addendum to the Saskatchewan Society of Occupational Therapists brief to Task Force on Rehabilitation, Projected Manpower Requirements in Occupational Therapy, February 19, 1980.

Saskatchewan Society of Occupational Therapists, Response to the Report of the Saskatchewan Task Force on Rehabilitation, June 1981.

Saskatchewan Task Force on Rehabilitation, Report of the Saskatchewan Task Force on Rehabilitation, December 1980.

ARTICLES

Kieran, N., "Occupational Therapists: A Helping Hand" The Globe and Mail, June 29, 1981.

PROVINCIAL HEALTH MANPOWER REFERENCE SOURCES

BRITISH COLUMBIA

- Rollcall 79 - A Status Report of Health Personnel in the Province of British Columbia.
  Report R:12
  Division of Health Services Research and Development
  Health Sciences Centre,
  University of British Columbia.

- Rollcall Update 80 - A Status Report of Selected Health Personnel in the Province of British Columbia.
  Report R:16
  Division of Health Services Research and Development
  Health Sciences Centre,
  University of British Columbia.

ALBERTA

Health and Social Service Manpower in Alberta 1980

Alberta - Health and Social Services
Disciplines Committee.

SASKATCHEWAN

Annual Report 1978 - Saskatchewan Health Manpower

Saskatchewan Health.

MANITOBA

Health Manpower Provincial Report - Manitoba 1980.

Manitoba - Department of Health
Research Section.

Province of
British Columbia

Province of
Alberta

Province of
Saskatchewan

Province of
Manitoba

WESTERN CANADA
HEALTH MANPOWER TRAINING STUDY

Category # 3 Report XVI

PHARMACISTS

REPORT XVI

PHARMACISTS:

THE REQUIREMENT FOR ALTERNATIVE TRAINING AND FUNDING ARRANGEMENTS IN WESTERN CANADA

REPORT XVI

PHARMACISTS OCCUPATION

TABLE OF CONTENTS

PAGE

I. INTRODUCTION

Study Background..... 1
Study Objectives..... 1
Study Approach..... 2
Occupation Definition..... 4

II. TRAINING NEEDS IN WESTERN CANADA

Manpower Requirements..... 5
Existing Training Programs..... 6
Occupational Issues..... 6

III. TRAINING RESPONSES

Decision Process..... 9
Timing and Location of Manpower Requirement..... 9
Indicated Manpower Responses.....11
Defined Alternative Locations.....12

IV. RECOMMENDATIONS.....14

APPENDIX I - Study Approach and Methodology
APPENDIX II - Provincial Net Manpower Requirement
APPENDIX III - Scope of Practice
APPENDIX IV - Bibliography

I. INTRODUCTION

STUDY BACKGROUND

The provision of effective health services to the community is, to a considerable degree, dependent on three essential resources:

- an adequate supply of well trained specialist staff in each health occupation group
- the development of adequate facilities to service the community
- the availability of adequate funds to ensure cost-effective and efficient health services.

The range and complexity of health treatment programs has expanded greatly in Canada during the last twenty-five years. In addition, changing technology and the development of new treatment programs have resulted in an increased requirement for skilled, adequately trained health manpower. These factors have resulted in an increased emphasis on manpower planning and skill training for health occupations to ensure an adequate supply of trained practitioners to meet defined manpower requirements.

STUDY OBJECTIVES

The Western Canada Health Manpower Training Study was initiated by the western Premiers at their annual conference in 1980. The study terms of reference contain two major objectives. These are:

- to assess the existing and future needs for health manpower training programs and facilities in western Canada

- to make recommendations for the rationalization of the location and funding of health manpower training programs and facilities in western Canada.

STUDY APPROACH

The study was under the direction of a Steering Committee consisting of health and education representatives from the Provinces of British Columbia, Alberta, Saskatchewan and Manitoba. The study took place over two years and consisted of a review of 26 health occupations grouped into five categories. Each occupation has been studied separately and a report has been produced for each. In addition, a report examining the inter-relations of the occupations has been submitted to the Steering Committee.

Data was collected from provincial and national associations and from government agencies for each of the occupations on the numbers of individuals registered with the associations and their current status as active or inactive practitioners. An attempt was also made to gather data on historical trends, the number of graduates from training, trends in movement of active practitioners to inactive status, occupational shifts out of the profession, trends in migration to and from other provinces, and immigration and emigration.

In the cases where validated and reliable information was not available, association spokesmen, employers and individuals in each of the occupations were interviewed to provide opinions regarding present and future trends affecting the manpower supply and requirement.

A literature review was conducted to examine the problems facing the occupation. A bibliography of the material reviewed is contained in Appendix IV.

A health manpower computer model was developed to assist in the preparation of projections on the future supply and requirement for each occupation. A critical analysis of these twenty-year projections was then undertaken to develop the various supply and requirement scenarios presented in this report.

Separate documents describing the manpower planning methodology and the training decision-making process were issued. A brief summary of the overall study approach and methodology is set out in Appendix I and details of the provincial net requirements are set out in Appendix II.

OCCUPATION DEFINITION

This report addresses the need for training programs for pharmacists in each of the four provinces.

Pharmacists work predominantly in a retail or hospital setting. For the purpose of this study a retail pharmacist is defined as an individual who:

"compounds and dispenses prescribed pharmaceuticals and related preparations. Prepares or supervises preparation of liquid medicines, ointments, powders, pills and other medications. Checks prescriptions for overdoses and drug interactions. Weighs, measures and mixes drugs and other medicinal compounds and fills bottles and capsules with correct quantity and composition of preparation. Stores and preserves biologicals, vaccines, serums and other drugs to prevent deterioration. Dispenses medical and surgical products for internal and external use as prescribed. Maintains patient medication profiles and records prescriptions dispensed and poisons and narcotics issued. Orders and maintains stock of pharmaceutical supplies. Provides information on uses and effects of medicaments. Sells non-prescription drugs, sick-room supplies, toiletries, cosmetics, lotions and other commercial products."[1]

A hospital pharmacist is defined as an individual who:

"compounds and dispenses drugs and medicines in a hospital. Reviews prescriptions to ensure proper doses have been prescribed and that toxic compounds will not be formed. Fills prescriptions and prepares pharmaceuticals, using various physical and chemical procedures. Prepares and sterilizes medications for injections. Bottles, labels and packages prepared compounds. Forwards prescriptions and other preparations to various hospital departments. Maintains inventory of all pharmaceuticals issued and returned. Maintains control records of narcotics, poisons, habit-forming drugs and prescription files. Advises medical staff on drug incompatibility, contra-indications and other relevant information. Maintains stock of supplies."[2]

Pharmacists also work in industrial organizations and with government agencies.

1. Canadian Classification and Dictionary of Occupations, No. 3151, 1980 Revision.

2. Ibid., No. 3151.

Exhibit 1: Manpower Requirements

Western Canada: PHARMACISTS

(Based on Most Likely Scenario From Each Province)

Year	Projected Stock		Projected Requirement
1981	5196		5216
		Net	20
1982	5307		5327
		Net	20
1983	5400		5445
		Net	45
1984	5531		5557
		Net	26
1985	5666		5671
		Net	5
1990	6580		6213
		Net	-367
1995	7554		6784
		Net	-770
2000	8656		7494
		Net	-1162

II - TRAINING NEEDS IN WESTERN CANADA

This section presents the statistical data for manpower requirements for western Canada, reviews the basis for projection and the confidence in basic data, outlines existing training programs for pharmacists, and discusses the major issues influencing the occupation.

MANPOWER REQUIREMENTS

Exhibit 1, opposite, shows the projected stock and requirement for pharmacists during the period 1981 - 2000. These projections are based on the most likely scenario derived for each province. It shows a balanced manpower situation to 1990, and then a surplus of practitioners to the year 2000. The annual surplus averages out to be approximately 60 practitioners per year in western Canada throughout the projected period.

Methodology

The most likely scenario for each province has been based on the medium population projection and a service utilization approach based on the pattern of drug usage by age and sex derived from the Saskatchewan Drug Plan. It has been assumed that the free drugs provided under this plan will not significantly affect drug usage. There is no service target ratio for this occupation and the population ratio method was not age/sex sensitive. The service utilization approach was considered to be the most accurate means by which to obtain manpower projections for each province. The service utilization approach is explained in Appendix I, below.

Degree of Confidence in Data

Projections of manpower supply have been prepared based on current manpower stock, net migration, net immigration, occupational shift including active/

TABLE 1

EXISTING TRAINING PROGRAMS - WESTERN CANADA

PHARMACISTS

	PROGRAMS	ESTIMATED GRADUATES
British Columbia	1	86
Alberta	1	90
Saskatchewan	1	55
Manitoba	1	45

inactive movements, training outputs and attrition. Since registration in the provincial association is mandatory for a practicing pharmacist, the data obtained from the associations is reasonably accurate. The association made estimates when factual data was not readily available. The estimates of future manpower supply are considered acceptable from the point of view of forecasting.

Details of the assumptions made for manpower supply are shown in Appendix II.

EXISTING TRAINING PROGRAMS

The existing training programs for pharmacists are shown in Table I, opposite.

A more detailed discussion of these training programs is contained in Report 3-A, "The Scope of Existing Training Programs Category III Occupations".

OCCUPATIONAL ISSUES

Several trends and issues will affect the pharmacist profession in the forecast period. These are:

- Increasing Proportion of Female Practitioners

  Pharmacy has never been an occupation exclusive to males, but in recent years the trend for females to enter the field has increased significantly. Currently, it is estimated that approximately 33% of active practitioners are female. In addition, it is estimated that one-half of recent graduates are female. This will result in an increased number of female practitioners in the future.

The profession should be closely monitored to determine the effect of this increase in female practitioners on the pattern of part-time work and the mobility pattern of this occupation. Trends in each of these factors will influence the future requirements for pharmacists in western Canada.

o Pattern of Employment

It is estimated that, based on survey data from the provinces of Alberta and Saskatchewan, approximately 25% to 30% of pharmacists work part-time. A survey conducted by the Saskatchewan University Studies Group in 1979 determined that the proportion of females working in excess of 31 hours per week had increased from 61% to 71% between 1978 and 1979. The 1980 survey indicated that there had been no significant changes in the work characteristics of provincial pharmacists. In contrast, a recent survey in the province of Manitoba estimated that approximately 10% of pharmacists in the province worked part-time.

In light of this limited information on the pattern of hours worked by female pharmacists, and given the high average number of hours worked per week, no attempt has been made to calculate full-time equivalent practitioners.

o Increasing Number of Specialized Positions

The majority of pharmacists have traditionally worked in retail settings with relatively few employed in the hospital environment. However, hospital management have recognized that the services provided by pharmacists contribute significantly to the care and treatment of patients and the number of budgeted hospital pharmacy positions has increased in recent years. Increased sophistication in medical programs has resulted in parallel increases in drug treatment and

research programs. In addition, pharmacists are branching out into new areas such as nuclear pharmacy. This trend to broaden pharmacy beyond the retail environment has an impact on the current and future requirements for pharmacists.

- Changing Role

Traditionally pharmacists spent much of their time packaging and dispensing drugs and maintaining manual patient records. Now, however, pre-packaged drug products have eliminated much of the time spent mixing and preparing prescriptions and computerization has eliminated the need for manual records. The remaining clerical tasks can be performed by pharmacy assistants. It is beyond the mandate of this study to review pharmacy assistants, but it appears that they enable the professional pharmacists to concentrate on pharmacy-related activities. Thus the role of the pharmacist has expanded to include patient education and counselling in the proper use of drugs, drug audit of prescription levels, and the monitoring of drug usage.

- Unit Dose System

The trend toward the unit dose system in hospitals began in part as a reaction to a lack of nursing manpower. In contrast to the traditional ward stock system, the unit dose system gives more responsibility to the pharmacist for organizing each patient's medication cycle. It appears, however, that the extra record keeping and dispensing tasks resulting from the introduction of a unit dose system could be done by pharmacy assistants. Therefore the unit dose system will not immediately increase the need for pharmacists. The continuing trend toward the unit dose system is subject to budget constraints and to the preference of the hospitals to utilize nurses rather than pharmacists in the drug preparation and dispensing.

Exhibit 2

Net Manpower Requirements by Province and Region

Most Likely Scenario

Occupation: PHARMACISTS

Year	British Columbia		Alberta		Saskatchewan		Manitoba		Region	
	Stock	Req	Stock	Req	Stock	Req	Stock	Req	Stock	Req
1981	1859	1905	1789	1747	808	815	740	749	5196	5216
Net		46		-42		7		9		20
1982	1865	1942	1891	1807	811	825	740	753	5307	5327
Net		77		-84		14		13		20
1983	1870	1980	2002	1871	814	837	714	757	5400	5445
Net		110		-131		23		43		45
1984	1875	2018	2119	1931	816	847	721	761	5531	5557
Net		143		-188		31		40		26
1985	1881	2058	2235	1988	818	859	732	766	5666	5671
Net		177		-247		41		34		5
1990	1996	2252	2963	2256	850	914	771	791	6580	6213
Net		256		-707		64		20		-367
1995	2093	2452	3815	2541	853	973	793	818	7554	6784
Net		359		-1274		120		25		-770
2000	2168	2693	4801	2892	871	1052	816	857	8656	7494
Net		525		-1909		181		41		-1162

III - TRAINING RESPONSES

DECISION PROCESS

The decision process, outlined in Appendix I and discussed in detail in Report C, "A Decision Process to Evaluate the Location of, and Funding Arrangements for Health Occupation Training Programs in Western Canada", was used to evaluate the training implications of the net manpower requirements for pharmacists discussed above. This section contains the results of this analysis.

TIMING AND LOCATION OF MANPOWER REQUIREMENT

Exhibit 2, opposite, shows the projected manpower requirement under the most likely scenario for the period 1981 - 2000 for each of the provinces. As the exhibit shows, there is an immediate requirement for additional pharmacists in British Columbia and Saskatchewan and a balance situation in Manitoba. Alberta shows a surplus of pharmacists. Specific discussion of the net manpower requirement for each province follows:

- British Columbia has a net requirement for 44 additional practitioners per year from 1981 to 1985 due to a high retirement rate in those years. From 1986 to 2000, the additional requirement drops to 23 per year.

- Alberta has a surplus of 78 practitioners per year from 1981 to 1990, with the surplus increasing to 120 per year throughout the next 10 years.

  The supply estimates used to determine these net manpower requirements were based on the historical rates of migration and immigration into the province.

TABLE 2

NET MANPOWER REQUIREMENT - UNDER ALTERNATIVE ASSUMPTION

PHARMACISTS - ALBERTA

YEAR	STOCK	REQUIREMENT
1981	1789	1747
NET		-42
1982	1891	1807
NET		-84
1983	2001	1871
NET		-130
1984	2118	1931
NET		-187
1985	2234	1988
NET		-246
1990	2545	2256
NET		-289
1995	2744	2541
NET		-203
2000	2931	2892
NET		-39

The potential impact of a surplus of pharmacists may result in reductions in this historical trend of migration and immigration. A sensitivity analysis was undertaken to assess the impact on future supply of a reduced level of migration and immigration into the province. Based on an assumption that migration and immigration rates will reduce by 50% over the next 5 - 10 years, and training outputs are maintained at current levels there is the potential for a surplus of 38 practitioners by the year 2000, or approximately 2 surplus practitioners throughout the forecast period.

Table 2, opposite, shows the projected supply of pharmacists in Alberta based on the following assumptions:

- Training output at 45 for 1986-2000
- Migration and Immigration rate reduced throughout the forecast period:

  - 1981-1985 1.7% (current rate)
  - 1985-1990 1.0%
  - 1990-2000 0.5%

In addition to the information obtained from the professional association on active registered stock, data from the March 1980 vacancy survey in the province of Alberta has been used to determine the surplus, or requirement for pharmacists in Alberta. This survey indicates that 1539 pharmacists were employed in either full-time or part-time positions. The association indicated that there were 1691 registered members in July 1980. This indicates that approximately 91% of active registered members of the association were employed, and that there is a labour market pool reserve of approximately 9%. For a further discussion of labour market supply refer to Appendix I.

The training recommendations for the province of Alberta have been developed on an assumption that the province will wish to maintain this relationship between labour market supply and the number employed, and train the required number of practitioners to maintain the current balance.

- Saskatchewan has a net requirement for approximately 10 practitioners per year from 1981 to 2000. This slight requirement is due to the number of pharmacists migrating out of the province.

- Manitoba has a minimal net requirement for 2 additional pharmacists per year from 1981 to 2000. Given the small number, it is appropriate to designate a balance situation for Manitoba.

In summary an examination of the four western provinces together indicates that a balance situation exists from 1981 until 1990 and then a surplus of 80 practitioners per year occurs from 1990 to 2000. The initial balance manpower situation is due to the British Columbia requirement being cancelled out by the Alberta surplus. However, Alberta's surplus continues to increase after 1990 and results in a surplus at the regional level.

INDICATED MANPOWER RESPONSES

Changes to current training outputs would result in achieving a manpower situation where the requirement or surplus for pharmacists in each province could be balanced. However, changes in the historical patterns of migration and immigration could also result in a more appropriate distribution of pharmacists in the western Canada region.

DEFINED ALTERNATIVE LOCATIONS

Given the requirement for an average of 40 pharmacists per year in British Columbia, the current program could be expanded, or alternately, a new program could be established at another university. However, it is also possible that migration into the province could increase, particularly from Alberta where there is a potential for a surplus of practitioners. Although the number of female practitioners is increasing in this occupation, it appears that, given the level of education received and the free enterprise system, the females are not necessarily less mobile than men. In the recent past, a number of pharmacists of both sexes have been moving into Alberta. Given the need for pharmacists in British Columbia, migrants and immigrants might relocate to British Columbia rather than to Alberta.

The potential for changed levels of migration/immigration could also influence the projected surplus of practitioners in Alberta. Since it may become more difficult for pharmacists to become established in Alberta (due to a surplus situation), there may be a tendency for pharmacists to no longer enter the province in such great numbers. A training response to the surplus would be to reduce the enrolment of the current program.

Saskatchewan and Manitoba are in an approximately balanced situation. The need in Saskatchewan for 13 pharmacists a year could be met by increasing the ratio of output to input of students in the training program. As in the other provinces, a need for practitioners may reduce the number of out-migrants, thereby reducing or eliminating the requirement.

It is apparent that any immediate major changes in training enrolments at the provincial level are not justified, given the potential for a balanced manpower situation at the regional level. The major factor that will influence the future training strategies at the provincial level is the future trends and pattern of movement (migration/immigration). Given the

uncertainties of projections on migration it is recommended that the governments of Alberta and British Columbia monitor the manpower situation for pharmacists to determine if the provincial imbalance is self correcting. It is suggested that alternative strategies be considered to attract pharmacists from Alberta to British Columbia.

IV - RECOMMENDATIONS

Recommendations for each of the four provinces are set out below.

- British Columbia

.1- That the current program enrolment in British Columbia be expanded by 50 students if the monitored in-migration does not satisfy the requirement for practitioners.

- Alberta

.2- That the program in Alberta be reduced in a phased manner according to the numbers of migrants and immigrants entering the province, with the aim of halving the program size over the next 20 years.

- Saskatchewan

.3- That the current enrolment in the Saskatchewan program be maintained.

- Manitoba

.4- That the current enrolment in the Manitoba program be maintained.

- General Recommendations

.5- That provincial government manpower planners monitor the pattern of movement, and determine appropriate changes to training strategies based on the current manpower situation.

APPENDIX I

STUDY APPROACH AND METHODOLOGY

STUDY APPROACH

Introduction

In order to achieve the study objectives, the work program consists of three key activities. These are:

- the analysis of manpower supply and requirements, and the calculation of net manpower requirements
- the analysis of existing training programs for Western Canada
- the development of recommendations for alternative training locations and funding arrangements

Analysis of Manpower Supply and Requirements

The analysis of manpower supply and requirements is designed to allow for a variety of data inputs, and for different emphasis depending on the occupation under review. A variety of data sources are used including provincial and national associations, health insurance agencies, and provincial health and education departments. In all instances, data is developed independently of previously published sources.

In addition to the basic projection of net manpower requirements, a number of sensitivity analyses have been completed to assess the impact of changed in the factors affecting supply and requirements, prior to developing recommendations for either additional training programs, or expanding existing training programs.

Approaches to Determining Manpower Requirements

The approach developed to determine manpower requirements uses three methods of projection. These are discussed below.

1. Service Utilization Approach

The utilization approach is based on an analysis of the pattern of health service usage. It establishes trends in service utilization and projects these onto future population estimates. There are three steps in the service utilization approach.

Step 1 - Determine Per Capita Utilization Rate

Historical data of the number of services provided, by age and sex of recipient is derived. The number of services per age/sex group is then divided by the population for group in the corresponding year. This results in a per capita utilization rate.

Step 2 - Project Future Service Required

The per capita utilization rate is projected onto the low, medium and high population for each year from 1981 to 2000. This results in an estimate of total future services.

Step 3 - Estimated Number of Practitioners Required

Having determined the total future services, the model projects the number of practitioners required, by assuming a constant level of services per practitioner. The number of services per practitioner is determined by dividing total services by the number of practitioners in the base year. To estimate the required number of practitioners, the model divides total future services required by the number of services per practitioner.

2. Service Target Ratio Approach

Service target ratios reflect a theorectical optimal manpower level required to meet health service requirements in the occupation under review. They are expressed as the ratio of practitioner to population. The service target ratios are derived based on discussion with health authorities, review of published reports, articles and summary of defined health care needs.

3. Population Ratio Approach

Population ratios are derived by dividing the total population at a specific point in time by the number of active practitioners. This results in a ratio of practitioners to population.

These ratios are analysed to determine if any trends exists. to project futuren manpower requirements, the model divides total projected population by the previously determined population ratio.

Summary of Approaches to Projecting Manpower Requirements

The three approaches outlined above have been used for the calculation of manpower requirements for this occupation. The specific application of each approach to this occupation is discussed under General Assumption, Appendix II, following.

Development of Recommendations for Alternative Training Locations and Funding Arrangements

We have developed a decision process to assist in developing recommendations for alternative training location(s) and funding arrangements. This process is designed to allow for the logical, consistent evaluation of a range of training alternatives.

There are seven steps in the decision process:

- Step 1. Analysis of manpower requirements
- Step 2. Identification of the appropriate type(s) of training
- Step 3. Definition of alternative training locations
- Step 4. Evaluation of alternative locations for new programs
- Step 5. Establishment of timing of training program requirement
- Step 6. Recommendation on training action(s) and location(s)
- Step 7. Recommendation on funding alternative(s)

LABOUR MARKET SUPPLY

Labour market supply is the relationship between the estimated number of practitioners registered with the provincial associations, the number of practitioners actually employed and the number of vacant positions. Vacancy survey data (normally collected by provincial governments) will identify the total number of budgeted positions, which is the total of the number currently employed plus vacancies.

Labour market supply is a useful tool to estimate, or determine the employment situation for each occupation. The current supply situation is expressed as total budgeted positions divided by the total number of registered practitioners. This percentage (%) of qualified practitioners who are currently employed will indicate the flexability of the existing labour market.

Typically the flexability of the labour market will reflect vacancy rates. The following table illustrates theoretical labour market situations:

"Tight" labour market - 90% - 95% of practitioners actively employed with a vacancy rate of 12% to 20%.

"Balanced" Labour Market - 80% - 90% of practitioners actively employed with a vacancy rate of 8% to 12%.

"Loose" Labour Market - 70% - 80% of practitioners actively employed with a vacancy rate of 0% to 8%.

APPENDIX II

PROVINCIAL NET MANPOWER REQUIREMENTS

Table XVI.0.1

Number of Practitioners by Province in Western Canada

Occupation: PHARMACISTS

Year	British[1] Columbia	Alberta[2]	Saskatchewan[3]	Manitoba[4]
1976	-	1314	759	686
1977	-	149	780	710
1978	1789	1509	802	739
1979	1810	1609	793	721
1980	1868	1691	805	743

SOURCE:

1 H.M.R.U., HEALTH MANPOWER RESEARCH UNIT

2 A.P.A., ALBERTA PHARMACEUTICAL ASSOCIATION

3 S.P.A., SASKATCHEWAN PHARMACEUTICAL ASSOCIATION

4 M.P.A., MANITOBA PHARMACEUTICAL ASSOCIATION

Table XVI.0.2

Factors Affecting Manpower Supply in Western Canada

Occupation: PHARMACISTS

Factor	British Columbia	Alberta
Opening Stock	1868	1691
Net Migration	25 for all years	1.7% of stock
Net Immigration	7 for all years	1.7% of stock
Net Occupation Shift	-4% of stock	-10 for all years
Training Output	86 for 1981 100 for 1982-2000	90 for all years
Attrition	Actual Retirement	Actual Retirement

	Saskatchewan	Manitoba
Opening Stock	805	743
Net Migration	-4% of stock	-2.6% of stock
Net Immigration	1 for all years	Zero for all years
Net Occupation Shift	-1% of stock	-1% of stock
Training Output	55 for all years	45 for all years
Attrition	Actual Retirement	Actual Retirement

GENERAL ASSUMPTIONS

Manpower Stock

Table XVI.0.1, opposite, indicates the total number of pharmacists registered in western Canada. It shows those practitioners who are active in their respective provinces as identified by the sources noted at the bottom of the table.

Factors Affecting Manpower Supply

The assumptions made with respect to each of the factors which have the potential to affect manpower stock are shown opposite in Table XVI.0.2. These factors include migration, immigration, occupational shift, training output, and attrition. The age distribution of practitioners is shown in Table XVI.0.3.

Estimating Requirements

- Historical Ratio

  The current ratio of pharmacists to population was calculated by province to project the number of practitioners required in the future to maintain the current level of manpower. However, this projection method was not selected as the preferred scenario because age/sex data was available, thus making the utilization method more accurate.

- Utilization Method

  The Saskatchewan Drug Plan has information on the pattern of drug usage by the province's citizen demographics. This usage pattern has been applied to the population age/sex projections of each of the other

TABLE IX.0.3

AGE STRUCTURE OF PHARMACISTS BY PROVINCE AND REGION

AGE GROUP	B.C.	ALBERTA	SASK.	MANITOBA	TOTAL #	TOTAL %
24 or less	377	187	54	60	1,407	27
25 - 29		408	183	138		
30 - 34	559	300	131	132	1,528	30
35 - 39		211	120	75		
40 - 44	325	152	60	51	825	16
45 - 49		135	50	52		
50 - 54	316	138	68	67	777	15
55 - 59		91	45	52		
60 - 64	259	77	32	49	608	12
65 & over		85	39	67		
Unknown	-	-	2	-	2	
TOTAL	1,836	1,784	784	743	5,147	100

three provinces as obtained from Statistics Canada. It was felt that this method was more accurate than the population ratio method, and that the pattern of drug usage would not be significantly different province to province.

- Service Target Ratio

  There is no generally accepted service target ratio.

Sensitivity Analysis

There is currently a high rate of migration and immigration into the province of Alberta. Supply projections for Alberta were based on a continuation of this historical trend. However, there is an indicated surplus of practitioners in the province of Alberta throughout the forecast period. Sensitivity analysis was undertaken to assess the impact of future supply of a reduced level of net migration and net immigration in the province of Alberta. Projections of future supply were prepared on the assumption of a 50% reduction in migration and immigration rates after an initial 5 year period. This assumption reflects a more probable situation for determining future supply.

According to the Province of Alberta's vacancy survey, a high proportion of pharmacists work part-time. If a part-time rate could be applied to the four provinces, then the requirement for practitioners in British Columbia and Saskatchewan would increase, a need in Manitoba would be created, and the surplus in Alberta would be reduced.

Table XVI.1.1

Province: BRITISH COLUMBIA
Occupation: PHARMACISTS

Year	Number of Practitioners	Population to Manpower
1978	1789	1: 1415
1979	1810	1: 1425
1980	1868	1: 1400

SOURCE:

H.M.R.U. IS HEALTH MANPOWER RESEARCH UNIT

TABLE XVI.1.2

TOTAL NUMBER OF ACTIVE

PHARMICISTS IN BRITISH COLUMBIA BY AGE

AGE GROUP	MALE	FEMALE	TOTAL
20 - 29	176	201	377
30 - 39	318	241	559
40 - 49	242	83	325
50 - 59	256	60	316
60 and over	238	21	259
Unknown	-	-	-
Total	1,230	606	1,836

Source: H.M.R.U. The unknowns were allocated to the known age categories on the basis of the existing distribution of ages.

PROVINCIAL ASSUMPTIONS

BRITISH COLUMBIA

a) Legal Controls

The Pharmacists Act (R.S. Chapter 326, 1979) controls the right of individuals to practice pharmacy in British Columbia.

The certification and licensing requirements are shown in Appendix III - Scope of Practice.

b) Assumptions

o Manpower Stock

Table XVI.1.1, opposite, shows the total number of pharmacists registered in British Columbia. The 1980 figure excludes those practitioners who are working in other occupations, or otherwise not practicing as pharmacists. For the purposes of this study, it has been assumed that the registered pharmacists are working full-time. The age distribution of practitioners is shown in Table XVI.1.2, opposite. The total practitioners resulting from the age distribution records of the Health Manpower Research Unit are different from the total manpower stock number from the same source because the age/sex distribution was recorded as of June, 1981, whereas the stock number is of September, 1980.

o Factors Affecting Manpower Supply

The assumptions made with respect to each of the factors which potentially affect manpower stock are shown in Table XVI.1.3,

Table XVI.1.3

Factors Affecting Manpower Supply

Province: BRITISH COLUMBIA
Occupation: PHARMACISTS

Factor	Assumption	Source
Opening Stock	1868	H.M.R.U.[2]
Net Migration	25 for all years	H.M.R.U.
Net Immigration	7 for all years	H.M.R.U.
Net Occupational Shift[1]	-4% of stock	H.M.R.U.
Training Output	86 for 1981 100 for 1982-2000	MINISTRY OF EDUCATION
Attrition	Actual Retirement	H.M.R.U.

Notes:

[1] Includes Active/Inactive Flows

[2] H.M.R.U. IS HEALTH MANPOWER RESEARCH UNIT

opposite. For each assumption, the information source has been identified. Comments on each factor are shown below:

Factor	Level of Confidence
• migration	H.M.R.U. has data on in-migrants. College of Pharmacy estimated number of out-migrants.
• immigration	H.M.R.U. has data on immigrants. College of Pharmacy estimated number of emigrants.
• occupational shift	H.M.R.U. data.
• training output	Ministry of Education. Our recommendations have been based on the graduating years 1987 to 2000, as it will take 5 years for graduates to impact the manpower stock.
• attrition	Age distribution from H.M.R.U.

o Estimating Requirements

• Historical Ratio

The current ratio of pharmacists to population of 1:1,400 was used to project the number of practitioners required in the future to maintain the current level of manpower.

TABLE XVI.1.4: MANPOWER REQUIREMENTS

PROVINCE: BRITISH COLUMBIA

OCCUPATION: PHARMACISTS

PROJECTED MANPOWER REQUIREMENTS

YEAR	PROJECTED STOCK	UTILIZATION APPROACH MEDIUM POPULATION
1981	1,859	1,905
NET		46
1982	1,865	1,942
NET		77
1983	1,870	1,980
NET		110
1984	1,875	2,018
NET		143
1985	1,881	2,058
NET		177
1990	1,996	2,252
NET		256
1995	2,093	2,452
NET		359
2000	2,168	2,693
NET		525

- Utilization Method

  A pattern of drug usage by age/sex cohort and based on the data obtained from the Saskatchewan Drug Plan was applied to the projected population of the Province of British Columbia to determine the future manpower requirement.

o Net Manpower Requirements

The net manpower requirements under the most likely scenario are shown in Table XVI.1.4, opposite. The most likely scenario is based on the utilization of drugs by citizen demographics under the medium population projection. On the basis of this analysis, there is a projected requirement for additional practitioners immediately.

Table XVI.2.1

Province: ALBERTA
Occupation: PHARMACISTS

Year	Number of Practitioners	Population to Manpower
1976	1314	1: 1400
1977	1419	1: 1340
1978	1509	1: 1300
1979	1609	1: 1255
1980	1691	1: 1230

SOURCE:

A.P.A IS ALBERTA PHARMACEUTICAL ASSOCIATION

TABLE XVI.2.2

TOTAL NUMBER OF ACTIVE

PHARMICISTS IN ALBERTA BY AGE

AGE GROUP	MALE	FEMALE	TOTAL
20 - 24	94	93	187
25 - 29	237	171	408
30 - 34	125	175	300
35 - 39	104	107	211
40 - 44	75	77	152
45 - 49	101	34	135
50 - 54	97	41	138
55 - 59	56	35	91
60 - 64	68	9	77
65 and over	71	14	85
Unknown	-	-	-
Total	1,708	756	1,784

Source: Alberta Pharmaceutical Association.

ALBERTA

a) Legal Controls

The Pharmaceutical Association Act (R.S. Chapter 274, 1977) controls the right of individuals to practice pharmacy in Alberta.

The certification and licensing requirements are shown in Appendix III - Scope of Practice.

b) Assumptions

o Manpower Stock

Table XVI.2.1, opposite, indicates the total number of pharmacists registered in Alberta. The 1980 figure excludes those practitioners who are working in other occupations, or otherwise not practicing as pharmacists. For the purposes of this study, it has been assumed that the registered pharmacists are working full-time. The age distribution of practitioners is shown in Table XVI.2.2, opposite. The total practitioners resulting from the age distribution records of the Alberta Pharmaceutical Association are different from the total manpower stock for 1980 because it was acquired from another source of records within the Association and is effective as of June, 1981.

o Factors Affecting Manpower Supply

The assumptions made with respect to each of the factors which potentially affect manpower stock are shown in Table XVI.2.3, opposite. For each assumption, the information source has been identified. Comments on each factor are shown below:

Table XVI.2.3

Factors Affecting Manpower Supply

Province: ALBERTA
Occupation: PHARMACISTS

Factor	Assumption	Source
Opening Stock	1691	A.P.A.[2]
Net Migration	1.7% of stock	A.P.A.
Net Immigration	1.7% of stock	A.P.A.
Net Occupational Shift[1]	-10 for all years	A.P.A.
Training Output	90 for all years	U. of A.[3]
Attrition	Actual Retirement	A.P.A.

Notes:

[1] Includes Active/Inactive Flows

[2] A.P.A. is Alberta Pharmaceutical Association

[3] U. of A. is University of Alberta

Factor	Level of Confidence
. migration	Estimates from the Administrative Assistant of the Alberta Pharmaceutical Association.
. immigration	Estimates from the Administrative Assistant of the Alberta Pharmaceutical Association.
. occupational shift	Estimates from the Administrative Assistant of the Alberta Pharmaceutical Association.
. training output	University of Alberta. Since it will take 5 years for graduates to impact the manpower stock, our recommendations have been based on the graduating years 1987 to 2000.
. attrition	Age distribution from Alberta Pharmaceutical Association.

o Estimating Requirements

. Historical Ratio

The current ratio of pharmacists to population of 1:1,230 was used to project the number of practitioners required in the future to maintain the current level of manpower.

TABLE XVI.2.4: MANPOWER REQUIREMENTS

PROVINCE: ALBERTA

OCCUPATION: PHARMACISTS

PROJECTED MANPOWER REQUIREMENTS

YEAR	PROJECTED STOCK	UTILIZATION APPROACH MEDIUM POPULATION
1981	1,789	1,747
NET		-42
1982	1,891	1,807
NET		-84
1983	2,002	1,871
NET		-131
1984	2,119	1,931
NET		-188
1985	2,235	1,988
NET		-247
1990	2,963	2,256
NET		-707
1995	3,815	2,541
NET		-1274
2000	4,801	2,892
NET		-1909

. Utilization Method

A pattern of drug usage by age/sex cohort and based on the data obtained from the Saskatchewan Drug Plan was applied to the projected population of the Province of Alberta to determine the future manpower requirement.

o Net Manpower Requirements

Table XVI.2.4, opposite, shows the net manpower requirements under the most likely scenario. The most likely scenario is based on the utilization of drugs by citizen demographics under the medium population projection. There is a surplus of pharmacists in Alberta, due to the high rate of annual migration and immigration into the province.

o Sensitivity Analysis

There is currently a high rate of migration and immigration into the province of Alberta. Supply projections for Alberta were based on a continuation of this historical trend. However, there is an indicated surplus of practitioners in the province of Alberta throughout the forecast period. Sensitivity analysis was undertaken to assess the impact of future supply of a reduced level of net migration and net immigration in the province of Alberta. Projections of future supply were prepared on the assumption of a 50% reduction in migration and immigration rates after an initial 5 year period. This assumption reflects a more probable situation for determining future supply.

According to the Province of Alberta's vacancy survey, a high proportion of pharmacists work part-time. If a part-time rate could be applied to the four provinces, then the requirement for practitioners in British Columbia and Saskatchewan would increase, a need in Manitoba would be created, and the surplus in Alberta would be reduced.

Table XVI.3.1

Province: SASKATCHEWAN
Occupation: PHARMACISTS

Year	Number of Practitioners	Population to Manpower
1976	759	1: 1215
1977	780	1: 1200
1978	802	1: 1180
1979	793	1: 1200
1980	805	1: 1200

SOURCE:

S.P.A. IS SASKATCHEWAN PHARMACEUTICAL ASSOCIATION

TABLE XVI.3.2

TOTAL NUMBER OF ACTIVE

PHARMACISTS IN SASKATCHEWAN BY AGE

AGE GROUP	MALE	FEMALE	TOTAL
20 - 24	14	40	54
25 - 29	74	109	183
30 - 34	78	53	131
35 - 39	93	27	120
40 - 44	43	17	60
45 - 49	43	7	50
50 - 54	56	12	68
55 - 59	37	8	45
60 - 64	31	1	32
65 and over	38	1	39
Unknown	2	-	2
Total	509	275	784

Source: Saskatchewan Pharmaceutical Association.

SASKATCHEWAN

a) Legal Controls

The Pharmacy Act (R.S.S. Chap. P-9, 1978) controls the right of individuals to practice pharmacy in Saskatchewan.

The certification and licensing requirements are shown in Appendix III - Scope of Practice.

b) Assumptions

o Manpower Stock

Table XVI.3.1, opposite, shows the total number of pharmacists registered in Saskatchewan. The 1980 figure excludes those practitioners who are working in other occupations, or otherwise not practicing as pharmacists. For the purposes of this study, it has been assumed that the registered pharmacists are working full-time. The age distribution of practitioners is shown in Table XVI.3.2, opposite. The total number of 784 relates to those registered at June, 1980 whereas the opening stock figure indicates those registered at December 1980.

o Factors Affecting Manpower Supply

The assumptions made with respect to each of the factors which potentially affect manpower stock are shown in Table XVI.3.3, opposite. For each assumption, the information source has been identified. Comments on each factor are shown below:

Table XVI.3.3

Factors Affecting Manpower Supply

Province: SASKATCHEWAN
Occupation: PHARMACISTS

Factor	Assumption	Source
Opening Stock	805	S.P.A.[2]
Net Migration	-4% of stock	S.P.A.
Net Immigration	1 for all years	S.P.A.
Net Occupational Shift[1]	-1% of stock	S.P.A.
Training Output	55 for all years	U. of S.[3]
Attrition	Actual Retirement	S.P.A.

Notes:

[1] Includes Active/Inactive Flows

[2] S.P.A. is Saskatchewan Pharmaceutical Association

[3] U. of S. is University of Saskatchewan

Factor	Level of Confidence
• migration	S.P.A. records.
• immigration	S.P.A. has data on immigrants. S.P.A. Registrar estimated number of emigrants.
• occupational shift	S.P.A.
• training output	Registrar of University of Saskatchewan. Since it will take 5 years for graduates to impact the manpower stock, our recommendations have been based on the graduating years 1987 to 2000.
• attrition	Age distribution from S.P.A.

- Estimating Requirements

  - Historical Ratio

    The current ratio of pharmacists to population (1:1,200) was used to project the number of practitioners required in the future to maintain the current level of manpower.

  - Utilization Method

    A pattern of drug usage by age/sex cohort and based on the data from the provincial drug plan was applied to the projected population of the Province to determine future manpower demand.

TABLE XVI.3.4: MANPOWER REQUIREMENTS

PROVINCE: SASKATCHEWAN

OCCUPATION: PHARMACISTS

PROJECTED MANPOWER REQUIREMENTS

YEAR	PROJECTED STOCK	UTILIZATION APPROACH MEDIUM POPULATION
1981	808	815
NET		7
1982	811	825
NET		14
1983	814	837
NET		23
1984	816	847
NET		31
1985	818	859
NET		41
1990	850	914
NET		64
1995	853	973
NET		120
2000	871	1,052
NET		181

o Net Manpower Requirements

Table XVI.3.4, opposite, shows the net manpower requirements under the most likely scenario. The most likely scenario is based on the utilization of drugs by citizen demographics under the medium population projection. On the basis of this analysis, there is a small requirement for practitioners throughout the forecast period.

Table XVI.4.1

Province: MANITOBA
Occupation: PHARMACISTS

Year	Number of Practitioners	Population to Manpower
1976	686	1: 1490
1977	710	1: 1450
1978	739	1: 1400
1979	721	1: 1450
1980	743	1: 1420

SOURCE:

M.P.A. IS MANITOBA PHARMACEUTICAL ASSOCIATION

TABLE XVI.4.2

TOTAL NUMBER OF ACTIVE

PHARMICISTS IN MANITOBA BY AGE

AGE GROUP	MALE	FEMALE	TOTAL
20 - 24	22	38	60
25 - 29	82	56	138
30 - 34	60	72	132
35 - 39	45	30	75
40 - 44	42	9	51
45 - 49	48	4	52
50 - 54	62	5	67
55 - 59	43	9	52
60 - 64	47	2	49
65 and over	67	0	67
Unknown	-	-	-
Total	518	225	743

Source: Manitoba Pharmaceutical Association.

MANITOBA

a) Legal Controls

The Pharmaceutical Act (S.M. 1980-81, C.12 - Cap. p.60) controls the right of individuals to practice pharmacy in Manitoba.

The certification and licensing requirements are shown in Appendix III - Scope of Practice.

b) Assumptions

o Manpower Stock

Table XVI.4.1, opposite, shows the total number of pharmacists registered in Manitoba. The 1980 figure excludes those practitioners who are working in other occupations, or otherwise not practicing as pharmacists. For the purposes of this study, it has been assumed that the registered pharmacists are working full-time. The age distribution of practitioners as of June, 1981, is shown in Table XVI.4.2, opposite.

o Factors Affecting Manpower Supply

The assumptions made with respect to each of the factors which potentially affect manpower stock are shown in Table XVI.4.3, opposite. For each assumption, the information source has been identified. Comments on each factor are shown below:

Factor	Level of Confidence
. migration	M.P.A. has data on in-migrants. M.P.A. estimated number of out-migrants.

Table XVI.4.3

Factors Affecting Manpower Supply

Province: MANITOBA
Occupation: PHARMACISTS

Factor	Assumption	Source
Opening Stock	743	M.P.A.[2]
Net Migration	-2.6% of stock	M.P.A.
Net Immigration	Zero for all years	M.P.A.
Net Occupational Shift[1]	-1% of stock	M.P.A.
Training Output	45 for all years	U. OF M.[3]
Attrition	Actual Retirement	M.P.A.

Notes:

[1] Includes Active/Inactive Flows

[2] M.P.A. IS MANITOBA PHARMACEUTICAL ASSOCIATION

[3] U. OF M. IS UNIVERSITY OF MANITOBA

Factor	Level of Confidence
. immigration	M.P.A. has data on immigrants. M.P.A. estimated number of emigrants.
. occupational shift	M.P.A.
. training output	Registrar, University of Manitoba. Since it will take 5 years for graduates to impact the manpower stock, our recommendations have been based on the graduating years 1987 to 2000.
. attrition	Age distribution from M.P.A.

o Estimating Requirements

. Historical Ratio

The current ratio of pharmacists to population of 1:1,420 was used to project the number of practitioners required in the future to maintain the current level of manpower.

. Utilization Method

A pattern of drug usage by age/sex cohort and based on the data obtained from the Saskatchewan Drug Plan was applied to the projected population of the Province of Manitoba to determine the future manpower requirement.

TABLE XVI.4.4: MANPOWER REQUIREMENTS

PROVINCE: MANITOBA

OCCUPATION: PHARMACISTS

PROJECTED MANPOWER REQUIREMENTS

YEAR	PROJECTED STOCK	UTILIZATION METHOD MEDIUM POPULATION
1981	740	749
NET		9
1982	740	753
NET		13
1983	714	757
NET		43
1984	721	761
NET		40
1985	732	766
NET		34
1990	771	791
NET		20
1995	793	818
NET		25
2000	816	857
NET		41

o Net Manpower Requirements

Table XVI.4.4, opposite, shows the net manpower requirements under the most likely scenario. The most likely scenario is based on the utilization of drugs by citizen demographics, under the medium population projection. On the basis of this analysis, there is a balance in pharmacy manpower throughout the forecast period.

APPENDIX III - SCOPE OF PRACTICE

PHARMACISTS - SCOPE OF PRACTICE

PROVINCE	CERTIFICATION/LICENSING/REGISTRATION		
	REQUIRED CHARACTERISTICS OF APPLICANTS	CERTIFICATION REQUIREMENTS	LICENSING REQUIREMENTS
Saskatchewan The Pharmacy Act R.S.S. Chap P-9 1978	18 years of age. Good moral character.		Holds a degree of bachelor of science in pharmacy or holds a certificate entitling him to practice as a pharmaceutical chemist from any other pharmaceutical association. Successful completion of exams pursuant to the act.
Manitoba The Pharmaceutical Act S.M. 1980-81 C.12 - Cap. P60	Good Moral character. Resident of Canada. 18 years of age. Competence in one of the official languages of Canada.		Successful completion of a training period in a school of pharmacy recognized and approved by the council.

PHARMACISTS - SCOPE OF PRACTICE

PROVINCE	CERTIFICATION/LICENSING/REGISTRATION		
	REQUIRED CHARACTERISTICS OF APPLICANTS	CERTIFICATION REQUIREMENTS	LICENSING REQUIREMENTS
British Columbia Pharmacists Act R.S. Chap. 326 1979	Fluency in English Good moral character		Graduation with a degree of bachelor of science in pharmacy from the Univeristy of British Columbia, or is registered with the Pharmacy Examining Board of Canada and has passed examinations set by the Board. Served the prescribed period of clerkship.
Alberta The Pharmaceutical Association Act R.S. Chap. 274 1977	18 years of age. Good character and reputation. Name not struck from the register of any pharmaceutical association anywhere as a result of misconduct, professional or otherwise. Candian citizen or has lawfully been admitted to Canada for permanent residence		Holds degree of bachelor of science in pharmacy granted by any university under The Universities Act, or holds a certificate of qualifications issued by The Pharmacy Examing Board of Canada. Served the prescribed period of internship.

APPENDIX IV - BIBLIOGRAPHY

PHARMACISTS

BIBLIOGRAPHY

Alberta Career Resources Branch, Advanced Education and Manpower. Occupational Profiles - Pharmacist. Edmonton: October 1979.

Alberta Pharmaceutical Association. Report of the Manpower Study Committee. 1976.

Alberta, Province of. The Pharmaceutical Association Act, R.S. Chap. 274, 1977.

Alberta Social Services and Community Health, Alberta Health & Social Services Disciplines Committee, Research and Planning Division. Health and Social Services Manpower in Alberta, 1979. Edmonton.

----------. September 30, 1980 Survey of Major Employers of Health and Social Service Personnel in Alberta. Edmonton: February 1981.

British Columbia, Province of. The Pharmacists Act, R.S. Chap. 326, 1979.

Chappell, Neena L. and Gordon E. Barnes. "Women in Pharmacy". Contemporary Pharmacy Practice, Vol. 4, No. 1 (Winter 1981), pp. 16-21.

Manitoba, Province of. The Pharmaceutical Act, SM 1980-81, Chap. 12 - Cap. p. 60.

Manitoba, Province of, Departments of Health and Community Services, Research Section, Barbara Miller. Health Manpower Provincial Report, Manitoba 1979. Winnipeg: 1979.

Ontario, Province of, Department of Health. Manpower Provincial Report. Toronto.

Saskatchewan Pharmaceutical Association. Report of Council - Proposed Changes to the Standards of Practice. November 1979.

Saskatchewan, Province of. The Pharmacy Act, R.S.S. Chap. P-9, 1978.

Saskatchewan, Province of, Department of Health, Policy Research and Management Services Branch. Saskatchewan Health Manpower Annual Report - 1978. Regina.

University of British Columbia, Division of Health Services Research and Development, Health Sciences Centre. Production 79 -- A Status Report on the Production of Health and Human Services Personnel in the Province of British Columbia. Vancouver: 1980.

----------. Rollcall 79. Vancouver: 1980.

University of Saskatchewan, University Studies Group. A Survey of Pharmacy Graduates. Saskatoon: December 1978.

----------. Pharmacy Manpower in Saskatchewan. Saskatoon: October 1979 and October 1980.

Province of
British Columbia

Province of
Alberta

Province of
Saskatchewan

Province of
Manitoba

WESTERN CANADA
HEALTH MANPOWER TRAINING STUDY

Category # 3 Report XVII

PHYSIOTHERAPY

REPORT XVII

PHYSIOTHERAPISTS

THE REQUIREMENT FOR ALTERNATIVE TRAINING AND FUNDING ARRANGEMENTS IN WESTERN CANADA

REPORT XVII

PHYSIOTHERAPISTS

TABLE OF CONTENTS

PAGE

I. INTRODUCTION

Study Background.....1
Study Objectives.....1
Study Approach.....2
Occupation Definition.....4

II. TRAINING NEEDS IN WESTERN CANADA

Manpower Requirements.....5
Existing Training Program.....7
Occupational Issues.....7

III. TRAINING RESPONSES

Decision Process.....11
Timing and Location of Manpower Requirements.....11
Indicated Manpower Responses.....13

IV. RECOMMENDATIONS.....16

APPENDIX I - Study Approach and Methodology
APPENDIX II - Provincial Net Manpower Requirement
APPENDIX III - Scope of Practice
APPENDIX IV - Bibliography

I. INTRODUCTION

STUDY BACKGROUND

The provision of effective health services to the community is, to a considerable degree, dependent on three essential resources:

- an adequate supply of well-trained specialist staff in each health occupation group
- the development of adequate facilities to service the community
- the availability of adequate funds to ensure cost-effective and efficient health services.

The range and complexity of health treatment programs has expanded greatly in Canada during the last twenty-five years. In addition, changing technology and the development of new treatment programs have resulted in an increased requirement for skilled, adequately trained health manpower. These factors have resulted in an increased emphasis on manpower planning and skill training for health occupations to ensure an adequate supply of trained practitioners to meet defined manpower requirements.

STUDY OBJECTIVES

The Western Canada Health Manpower Training Study was initiated by the western Premiers at their annual conference in 1980. The study terms of reference contain two major objectives. These are:

- to assess the existing and future needs for health manpower training programs and facilities in western Canada

- to make recommendations for the rationalization of the location and funding of health manpower training programs and facilities in western Canada.

STUDY APPROACH

The study was under the direction of a Steering Committee consisting of health and education representatives from the Provinces of British Columbia, Alberta, Saskatchewan and Manitoba. The study took place over two years and consisted of a review of 26 health occupations grouped into five categories. Each occupation has been studied separately, and a report has been produced for each. In addition, a report examining the inter-relations of the occupations has been submitted to the Steering Committee.

Data was collected from provincial and national associations and from government agencies for each of the occupations on the numbers of individuals registered with the associations and their current status as active or inactive practitioners. An attempt was also made to gather data on historical trends, the number of graduates from training, trends in movement of active practitioners to inactive status, occupational shifts out of the profession, trends in migration to and from other provinces, and immigration and emigration.

In the cases where validated and reliable information was not available, association spokesmen, employers and individuals in each of the occupations were interviewed to provide qualitative opinions regarding present and future trends affecting the manpower supply and requirement.

A literature review was conducted to examine the problems facing the occupation. A bibliography of the material reviewed is contained in Appendix IV.

A health manpower computer model was developed to assist in the preparation of projections on the future supply and requirement for each occupation. A critical analysis of these twenty-year projections was then undertaken to develop the various supply and requirement scenarios presented in this report.

Separate documents describing the manpower planning methodology and the training decision-making process were issued. A brief summary of the overall study approach and methodology is set out in Appendix I and details of the provincial net requirements are set out in Appendix II.

OCCUPATION DEFINITION

This report addresses the need for training programs for physiotherapists in each of the four provinces. For the purpose of this study, a physiotherapist is defined as an an individual who:

"plans and carries out programs of physical treatment, in consultation with physicians and other health care workers, to rehabilitate injured or disabled patients. Administers muscle, nerve, joint and functional ability tests to identify physical problems of patients. Assesses patient's symptoms and capabilities. Directs and aids patients individually or in groups, in exercises designed to assist in muscle restoration and joint mobility. Guides patients in remedial activities involving use of parallel bars, weights, traction and other equipment. Gives whirlpool and contrast baths and applies moist packs. Administers treatments, using diathermy, ultrasonic and microwave machines, infra-red and ultra-violet lamps, low voltage generators and other electro-therapeutic equipment. Instructs patients and their families in procedures to be continued at home. Records treatments given and patient's responses and progress."[1]

1. Canadian Classification and Dictionary of Occupations, No. 3137-, 1980 Revision.

EXHIBIT 1: MANPOWER REQUIREMENTS

WESTERN CANADA: PHYSIOTHERAPISTS

YEAR	PROJECTED STOCK	PROJECTED REQUIREMENT		
		POPULATION RATIO[1]	SERVICE TARGET RATIO[2]	COMBINED RATIOS[3]
1981	2259	2226	2289	2647
		Net -33	30	388
1982	2333	2276	2342	2641
		Net -57	9	308
1983	2369	2328	2396	2768
		Net -41	27	399
1984	2409	2377	2451	2838
		Net -32	42	429
1985	2440	2426	2500	2887
		Net -14	60	447
1990	2509	2661	2743	3167
		Net 152	234	658
1995	2554	2887	2966	3423
		Net 323	412	869
2000	2541	3072	3174	3659
		Net 531	633	1118

Note: 1- POPULATION RATIOS

British Columbia	1:2,141
Alberta	1:4,172
Saskatchewan	1:4,591
Manitoba	1:4,286

2- SERVICE TARGET RATIO - all provinces
1:3,000

3- COMBINED RATIOS
British Columbia - Population Ratio 1:2,141
Alberta, Saskatchewan & Manitoba -
Service Target Ratio 1:3,000

II - TRAINING NEEDS IN WESTERN CANADA

This section presents the statistical data for manpower requirements for western Canada, reviews the basis for projection and the confidence in basic data, existing training programs for physiotherapists, and reviews the major issues influencing the occupation.

MANPOWER REQUIREMENTS

Exhibit 1, opposite, shows the projected stock and net requirement under three different scenarios for physiotherapists in Western Canada during the period 1981 - 2000.

Methodology

Three scenarios have been established using two different approaches to determine manpower requirements. The first uses a constant 1980 provincial population ratio approach for each of the western provinces. This approach assumes that each of the provinces will require the same number of physiotherapists per population as in 1980. Using this approach, the net manpower situation for physiotherapists in Western Canada indicates a requirement of approximately 531 additional physiotherapists by the year 2000.

The second approach to determine requirements uses a service target ratio. This approach identifies a ratio of 1 physiotherapist to 3,000 population as a reasonable requirement level to reach by the year 2000. (The basis for this service target is discussed in more detail in Appendix II.) Under the service target ratio approach there is a requirement for 633 additional physiotherapists in western Canada by the year 2000.

The third scenario is a combination of the population ratio and service target ratio approach. The population ratio of 1:2,141 is used to determine the net manpower requirements for British Columbia, and the service target ratio of 1:3,000 is used to determine the net manpower requirements for the provinces of Alberta, Saskatchewan and Manitoba. Under this scenario there is a net requirement of 1,118 additional physiotherapists in western Canada by the year 2000. This scenario has been determined as the most likely scenario reflecting the need for physiotherapists in Western Canada by the year 2000. The use of the population ratio approach for British Columbia assumes that British Columbia has established a unique utilization of physiotherapists, are utilizing them effectively and intend to maintain this level of physiotherapy services. The service target ratio for the provinces of Alberta, Saskatchewan and Manitoba, determines an optimum ratio and does not necessarily reflect the current situation. The ability to reach this optimum ratio is largely dependent on the availability of and level of government budgetary allocations and the priority to attain the optimum level of physiotherapy services.

Degree of Confidence in Data

The projected stock has been developed on the basis of historical and projected patterns of immigration, migration and occupational shift, current and projected levels of training and projected attrition from retirement at the age of 65.

The information for these projections has been derived from association records and estimates, and government data. In general, the information contained in these records has a reasonable level of accuracy and the projections for physiotherapists are considered to be acceptable for the purposes of this study.

TABLE 1

LOCATION OF TRAINING PROGRAMS FOR PHYSIOTHERAPISTS IN WESTERN CANADA

Province and Institution	Graduates
British Columbia	
University of British Columbia	28 (1981-86) 18 (1986-2000)
Alberta	
University of Alberta	35
Saskatchewan	
University of Saskatchewan	18
Manitoba	
University of Manitoba	20
Western Canada Total	101 (1981-86) 91 (1986-2000)

EXISTING TRAINING PROGRAMS

Table I, opposite, shows the location of, and the average number of graduates from the four programs in western Canada which train physiotherapists. The programs currently graduate approximately 101 students a year. This number is expected to decrease after 1986 to a graduation of 91 students a year.

British Columbia has traditionally had a combined physical and occupational therapy program. It is planned to split this combined program into two programs, one in occupational therapy and one in physical therapy. This change is expected to occur in 1982. The projections for this study are based on the assumption that there will be two separate programs by the year 1982. The number of students graduating from the new physiotherapy program is projected at 18. This is a reduction of approximately 10 graduates per year from the current output.

For a more detailed discussion of these training programs please refer to Report 3-A "The Scope of Existing Training Programs - Category III - Occupations".

OCCUPATIONAL ISSUES

The supply and requirements for physiotherapists in western Canada are influenced by a number of general trends and issues. These are:

Historical and Current Trends

o Developing Role

- The role of the physiotherapist has become established within the health care system. Recently, the profession has sought to

broaden the scope of practice, thereby increasing the responsibility level and role of physiotherapists and increasing the demand for physiotherapy services.

- The increased emphasis in the health care system on outpatient services, home care and extended care is considered to increase the requirement for physiotherapists.

- The development of sophisticated new treatment in a number of areas in the health care system is seen to increase the demand for physiotherapists. These would include that in respiratory care.

- A growing elderly population increases the demand for physiotherapy services.

o Proportion of Female Practitioners

- Currently it is estimated that approximately 87% of active physiotherapists are female. This high proportion of female physiotherapists is expected to continue.

o Pattern of Employment

- Based on the survey data from the provinces of Alberta and Saskatchewan, it is estimated that approximately 71% of physiotherapists work full-time. Limited information is available on the number of part-time hours worked per week, therefore the calculation of full-time equivalent practitioners has not been attempted. Actual requirements for physiotherapists are greater is ratios between part-time and full-time participation are taken into consideration.

Situations Likely to Occur with Major Policy Changes

o Immigration Patterns

- Historically, the Canadian Physiotherapy Association (CPA) has had a reciprocity agreement with physiotherapists entering Canada from commonwealth countries. As of September 1982, the Canadian Association will change its policy to require Commonwealth immigrants to complete the same entrance procedures as non-commonwealth immigrants. This will entail writing an examination and completing a four month residency in Canada before establishing eligibility for CPA membership.

  Previously an estimated 80% of the physiotherapy immigrants were from commonwealth countries. The CPA policy change is expected to have significant effects on the number of phys-iotherapists entering Canada from commonwealth countries.

  For this study, it has been estimated that this change will reduce by half the average number of physiotheraphists currently entering the country. Should the effect be more substantial, the net requirement for physiotherapists would be increased. Should the effect be less, the net requirement for physiotherapists would be decreased.

o Independent Practice

- In Canada, various constraints are put on the practice of physiotherapists. These include the requirement for a doctors referral, the ability to bill the provincial health care scheme and the amount billed to the health care scheme. These restrictions differ between provinces. Major changes on

these restrictions could result in easier access of the population to physiotherapy services, and an increase in the requirement for qualified physiotherapists.

o Input Substitution - Aides

. In both the U.S.A. and in certain Canadian provinces, there are different levels of physiotherapy manpower with different qualification requirements. These include the physiotherapist, physiotherapist assistant and physiotherapist aide. In the western provinces, all of these levels are not fully utilized. Should the health care system within the western provinces formally recognize, train, and take steps to utilize the different levels of physiotherapy manpower, the requirement for qualified physiotherapists may be reduced.

EXHIBIT 2

NET MANPOWER REQUIREMENTS BY PROVINCE

OCCUPATIONAL: PHYSIOTHERAPISTS

YEAR	BRITISH COLUMBIA		ALBERTA		SASKATCHEWAN		MANITOBA	
	POPULATION RATIO[1]	SERVICE TARGET[2]	POPULATION RATIO[1]	SERVICE TARGET[2]	POPULATION RATIO[1]	SERVICE TARGET[2]	POPULATION RATIO[1]	SERVICE TARGET[2]
1981	-25	-383	1	203	-5	108	-4	102
1982	-45	-410	6	216	-9	105	-9	98
1983	-36	-408	14	232	-8	108	-12	95
1984	-24	-403	22	248	-14	104	-16	93
1985	-12	-399	29	261	-12	108	-19	90
1990	116	-308	64	329	3	131	-31	82
1995	229	-228	111	407	22	157	-39	76
2000	362	-123	177	504	37	179	-45	73

NOTE: 1- POPULATION RATIOS

British Columbia	1:2,141
Alberta	1:4,172
Saskatchewan	1:4,591
Manitoba	1:4,286

2- SERVICE TARGET RATIO
1:3,000

III - TRAINING RESPONSES

DECISION PROCESS

The decision process outlined in Appendix I and discussed in detail in Report C, "A Decision Process To Evaluate the Location of, and Funding Arrangements For Health Occupation Training Programs in Western Canada", was used to evaluate the training implications of the net manpower requirements for dental mechanics discussed above. This section contains the results of this analysis.

TIMING AND LOCATION OF MANPOWER REQUIREMENTS

Exhibit 2, opposite, shows the projected net manpower requirement for physiotherapists in each of the western provinces for the period 1981 -2000. The projections are developed on both a constant 1980 provincial population ratio and a service target ratio of 1:3,000. The most likely scenario for physiotherapists in western Canada has been determined using a combined population ratio and service target ratio approach. The population ratio approach is used to determine the net requirements for physiotherapists in British Columbia and the service target ratio approach is used to determine the net requirements for physiotherapists in Alberta, Saskatchewan and Manitoba.

- **British Columbia**

  Under the 1980 population ratio, British Columbia has a small initial surplus of physiotherapists which changes to a requirement for 116 additional phsyiotherapists by 1990 and for 362 additional phsyiotherapists by the year 2000. This is an average annual requirement of 18 physiotherapists a year. Based on the service target

ratio of 1:3,000 in the province of British Columbia, there is a potential surplus of 123 physiotherapists by the year 2000.

- Alberta

In Alberta, the 1980 population ratio approach indicates a requirement for 177 additional physiotherapists by the year 2000. This is an average annual requirement of 9 physiotherapists. Under the service target ratio approach this requirement increases to 329 physiotherapists by the year 1990 and 504 physiotherapists by the year 2000, with an average annual requirement of 25 physiotherapists.

- Saskatchewan

In Saskatchewan, based on the 1980 population ratio, there is a requirement for 37 physiotherapists by the year 2000. This requirement develops slowly over the first 10 years of the projected time period and increases more rapidly between the years 1990 to 2000. Under the service target ratio approach, this requirement increases to 179 physiotherapists by the year 2000.

- Manitoba

In Manitoba, based on the 1980 population ratio, there is a surplus of 45 physiotherapists over the 20 year period. Under the service target ratio approach, this surplus changes to a requirement for 73 physiotherapists. This approximates to an average annual requirement of 4 additional physiotherapists.

INDICATED MANPOWER RESPONSES

The projected future supply of physiotherapists has been based on the potential reduction in the number of physiotherapists immigrating to western Canada. This reduction in immigration has been attributed to the change in policy of the Canadian Physiotherapy Association restricting the existing reciprocity agreement between Canada and Commonwealth countries.

The provincial physiotherapy associations have yet to determine the affect of this change on the number of immigrants from commonwealth countries. Estimates from the associations have anticipated a reduction in immigration of approximately half of their current levels. Some of the western provincial associations have identified possible ways of circumventing the new restrictions on commonwealth physiotherapists. These include the possible deletion of provincial physiotherapy regulations requiring eligibility to the Canadian Physiotherapy Association, and the establishment of less restrictive provincial guidelines for immigration policies.

The training recommendations for each of the provinces are based on individual situations. Because of the uncertainty as to the future flow of immigrants into British Columbia, the initial training recommendations are to increase enrolment in the physiotherapy training program by 10 places until 1985. At this time, the impact of any changes on immigration patterns should be assessed and adjustments made to training strategies to meet future manpower requirements.

For Alberta, two alternative training strategies have been developed, on the basis of the large requirement for physiotherapists. The training implications resulting from this large requirement are significant and are dependent on the government's priority in reaching the service target ratio of 1:3,000. Therefore, Alberta's alternatives include immediate implementation of training strategies to reach a service target ratio of

1:3,000 by the year 2000, or assessing government priorities regarding physiotherapy services and in the interim, instituting training strategies to meet a ratio of 1 physiotherapist to 3,500 people. In addition, Alberta has recently lifted restrictions on the number of independent physiotherapists who can bill the health care system. The effect of this change is not yet determined, however it has been suggested that the province may experience an increase in migration. Should this be the situation, training programs would not have to be increased to the extent suggested under the service target ratio of 1:3,000.

For the provinces of Saskatchewan and Manitoba training recommendations have been developed to reach a relative balance situation by the year 2000.

In Manitoba, the training recommendations are based on the assumption that the majority of graduates enter the Manitoba labour market. In reality, this has not always been the case, and the training recommendations for Manitoba therefore identify the need to analyze patterns of graduate employment and develop retention incentives for graduating students.

The training programs for physiotherapists require students to have clinical placements throughout the program. Various standards are developed for the facilities where students can be placed. As a result, any increase in training programs for physiotherapists would require a parallel increase in the number of clinical placements.

Alternative projections have been developed to determine the net manpower requirements for physiotherapists in western Canada. These have not been used to develop the most likely scenarios and they would require alternative manpower strategies. If British Columbia developed a level of 1 physiotherapist to 3,000 population, training programs could theoretically be reduced by approximately 9 places a year to develop a relative balance

situation by the year 2000. In Alberta, using the current population ratio approach, there remains a requirement for physiotherapists, which would result in a need for 12 additional graduates a year to reach a balance situation by the year 2000. In Saskatchewan, an additional 3 physiotherapists a year through training would be required to meet net manpower requirements under the population ratio approach. In Manitoba, the requirement based on the provincial population ratio approach would create a surplus by the year 2000 and therefore substantiate a reduction in the enrolment into the physiotherapy program by approximately 4 students a year.

Defined Alternative Location

In western Canada, training for physiotherapists is at the degree level. Therefore, alternative training locations must be in institutions with degree granting status. In British Columbia this would include the University of British Columbia and the University of Victoria. The existing University of British Columbia program training physiotherapists has been a combined physiotherapy/occupational therapy program. This program is expected to be split in 1982, therefore developing separate programs in each area. Additional training could be provided through this program, or as an alternative the University of Victoria would be a possible location for a training program should the priority be given to the establishment of a new program.

In Alberta, there is a substantial requirement for additional physiotherapists. Alternatives to meet this additional requirement are through either the development of a new program in physiotherapy, or an increase in the current program, along with the development of a new program. The most appropriate alternative location for a new physiotherapy program in Alberta would be at the University of Calgary.

IV - RECOMMENDATIONS

Recommendations for each of the four provinces are set out below.

- o British Columbia

  .1- That the University of British Columbia increase the number of enrolments in the physiotherapy program from 20 to 30 places a year and this level be maintained to 1985.

  .2- That for 1983 and 1984 the supply of physiotherapists be closely monitored to determine the impact of the 1982 change in policy issued by the Canadian Physiotherapy Association regarding the immigration of physiotherapists from Commonwealth countries.

  .3- That in 1985 the flow of immigration be determined and adjustments be made in the training program to meet the net manpower requirement by the year 2000.

- o Alberta

  .4- That, in order to reach a ratio of 1:3,000, the province of Alberta develop an additional program to train physiotherapists, that the program have an enrolment of 35 students.

  .5- That if the ratio of 1:3,000 is not supported by government priorities, the province of Alberta initiate training to meet the manpower requirement determined under a ratio of 1:3,500.

.6- That, in order to reach a ratio of 1:3,500, the province of Alberta increase the University of Alberta program in physiotherapy by 20 places to an annual enrolment of 60 students.

.7- That the requirement level for physiotherapists be reviewed in 1986 to determine the priority of reaching a service target ratio of 1:3,000 by the year 2000.

.8- That if determined a priority, the province of Alberta establish a new program in physiotherapy, to accomodate an enrolment of 25 students.

o Saskatchewan

.9- That the University of Saskatchewan increase the number of enrolments in the physiotherapy program by 15 to accommodate an annual enrolment of 35 students.

o Manitoba

.10- That the University of Manitoba increase the number of enrolments in the physiotherapy program by 6 places a year to accommodate an annual enrolment of 28 students.

.11- That the province of Manitoba study and develop retention incentives to ensure the entry of new graduates into the Manitoba labour market.

APPENDIX I

STUDY APPROACH AND METHODOLOGY

STUDY APPROACH

Introduction

In order to achieve the study objectives, the work program consists of three key activities. These are:

- the analysis of manpower supply and requirements, and the calculation of net manpower requirements
- the analysis of existing training programs for Western Canada
- the development of recommendations for alternative training locations and funding arrangements

Analysis of Manpower Supply and Requirements

The analysis of manpower supply and requirements is designed to allow for a variety of data inputs, and for different emphasis depending on the occupation under review. A variety of data sources are used including provincial and national associations, health insurance agencies, and provincial health and education departments. In all instances, data is developed independently of previously published sources.

In addition to the basic projection of net manpower requirements, a number of sensitivity analyses have been completed to assess the impact of changed in the factors affecting supply and requirements, prior to developing recommendations for either additional training programs, or expanding existing training programs.

Approaches to Determining Manpower Requirements

The approach developed to determine manpower requirements uses three methods of projection. These are discussed below.

1. Service Utilization Approach

The utilization approach is based on an analysis of the pattern of health service usage. It establishes trends in service utilization and projects these onto future population estimates. There are three steps in the service utilization approach.

Step 1 - Determine Per Capita Utilization Rate

Historical data of the number of services provided, by age and sex of recipient is derived. The number of services per age/sex group is then divided by the population for group in the corresponding year. This results in a per capita utilization rate.

Step 2 - Project Future Service Required

The per capita utilization rate is projected onto the low, medium and high population for each year from 1981 to 2000. This results in an estimate of total future services.

Step 3 - Estimated Number of Practitioners Required

Having determined the total future services, the model projects the number of practitioners required, by assuming a constant level of services per practitioner. The number of services per practitioner is determined by dividing total services by the number of practitioners in the base year. To estimate the required number of practitioners, the model divides total future services required by the number of services per practitioner.

2. Service Target Ratio Approach

Service target ratios reflect a theorectical optimal manpower level required to meet health service requirements in the occupation under review. They are expressed as the ratio of practitioner to population. The service target ratios are derived based on discussion with health authorities, review of published reports, articles and summary of defined health care needs.

3. Population Ratio Approach

Population ratios are derived by dividing the total population at a specific point in time by the number of active practitioners. This results in a ratio of practitioners to population.

These ratios are analysed to determine if any trends exists. to project futuren manpower requirements, the model divides total projected population by the previously determined population ratio.

Summary of Approaches to Projecting Manpower Requirements

The three approaches outlined above have been used for the calculation of manpower requirements for this occupation. The specific application of each approach to this occupation is discussed under General Assumption, Appendix II, following.

Development of Recommendations for Alternative Training Locations and Funding Arrangements

We have developed a decision process to assist in developing recommendations for alternative training location(s) and funding arrangements. This process is designed to allow for the logical, consistent evaluation of a range of training alternatives.

There are seven steps in the decision process:

- Step 1. Analysis of manpower requirements
- Step 2. Identification of the appropriate type(s) of training
- Step 3. Definition of alternative training locations
- Step 4. Evaluation of alternative locations for new programs
- Step 5. Establishment of timing of training program requirement
- Step 6. Recommendation on training action(s) and location(s)
- Step 7. Recommendation on funding alternative(s)

LABOUR MARKET SUPPLY

Labour market supply is the relationship between the estimated number of practitioners registered with the provincial associations, the number of practitioners actually employed and the number of vacant positions. Vacancy survey data (normally collected by provincial governments) will identify the total number of budgeted positions, which is the total of the number currently employed plus vacancies.

Labour market supply is a useful tool to estimate, or determine the employment situation for each occupation. The current supply situation is expressed as total budgeted positions divided by the total number of registered practitioners. This percentage (%) of qualified practitioners who are currently employed will indicate the flexability of the existing labour market.

Typically the flexability of the labour market will reflect vacancy rates. The following table illustrates theoretical labour market situations:

"Tight" labour market - 90% - 95% of practitioners actively employed with a vacancy rate of 12% to 20%.

"Balanced" Labour Market - 80% - 90% of practitioners actively employed with a vacancy rate of 8% to 12%.

"Loose" Labour Market - 70% - 80% of practitioners actively employed with a vacancy rate of 0% to 8%.

APPENDIX II

PROVINCIAL NET MANPOWER REQUIREMENTS

Table XVII.0.1

Number of Practitioners by Province in Western Canada

Occupation: PHYSIOTHERAPISTS

Year	British Columbia [1]	Alberta [2]	Saskatchewan [3]	Manitoba [4]
1973	679	-	-	-
1974	776	-	-	-
1975	859	-	110	-
1976	936	-	162	-
1977	918	-	181	217
1978	1021	474	174	232
1979	1124	420	189	246
1980	1225	499	210	246

SOURCE:

1 ASSOCIATION OF PHYSIOTHERAPISTS AND MASSAGE PRACTITIONERS OF BRITISH COLUMBIA (A.P.M.P.B.C.)

2 ASSOCIATION OF CHARTERED PHYSIOTHERAPISTS OF ALBERTA (A.C.P.A.)

3 SASKATCHEWAN PHYSICAL THERAPISTS ASSOCIATION (S.P.T.A.)

4 ASSOCIATION OF PHYSIOTHERAPISTS OF MANITOBA (A.P.M.)

NOTE:

THE DATA FOR EACH PROVINCE IS AN ESTIMATE OF ACTIVE PHYSIOTHERAPISTS

Table XVII.0.2

Factors Affecting Manpower Supply in Western Canada

Occupation: PHYSIOTHERAPISTS

Factor	British Columbia	Alberta
Opening Stock	1225	499
Net Migration	40 for all years	2 for all years
Net Immigration	53 for 1982-1982 28 for remaining	5 for 1981-1982 3 for remaining
Net Occupation Shift	-5% of opening stock	-5% of stock
Training Output	28 for 1981-1985 18 for remaining	35 for all years
Attrition	Actual Retirement	Actual Retirement

	Saskatchewan	Manitoba
Opening Stock	210	246
Net Migration	-10 for all years	-2 for all years
Net Immigration	10 for 1981-1982 5 for remaining	2 for 1981-1985 1 for remaining
Net Occupation Shift	-5% of opening stock	-5% of opening stock
Training Output	18 for all years 25 for 1984 only	20 for all years
Attrition	Zero for 1981-1988 2 for remaining	Actual Retirement

GENERAL ASSUMPTIONS

Manpower Stock

Table XVII.0.1, opposite, illustrates the total number of active physiotherapists identified in each of the provinces in western Canada.

Factors Affecting Manpower Supply

The assumptions made with respect to each of the factors which have the potential to affect manpower stock are shown opposite in Table XVII.0.2. These factors include migration, immigration, training output, active/inactive movement and retirement through attrition. For each of these assumptions, the information source has been identified. Assumptions affecting manpower have been based on historical and current information along with projected trends. Projections made for physiotherapists include a reduction in immigration by approximately one half after 1982.

The age distribution of physiotherapists is shown in Table XVII.0.3. Information from the age distribution has been used to project the retirement of physiotherapists at the age of 65 years.

Estimating Requirements

- Historical Ratio

  For each province, the current ratio of physiotherapists to population was used to project the number of practitioners required in the future to maintain to current level of manpower.

- Utilization

  The utilization approach was not used to determine net manpower requirements for physiotherapists. Utilization data for physiotherapists is not age specific, therefore it does not provide an

TABLE XVII.0.3

AGE STRUCTURE - PHYSIOTHERAPISTS

BY PROVINCE AND REGION

AGE GROUP	BRITISH COLUMBIA	ALBERTA	MANITOBA
24 or less	234	36	37
25 - 29		97	97
30 - 34	285	55	55
35 - 39		23	23
40 - 44	117	10	10
45 - 49		8	8
50 - 54	77	4	4
55 - 59		5	5
60 - 64	71	5	5
65 & over	11	2	2
UNKNOWN	430	253	-
TOTAL	1225	498	246

Note:

The age distributions are taken from association records and government data. The totals include active physiotherapists. The totals do not include the age distribution for physiotherapists not on record.

accurate utilization pattern of services related to the changing proportion of population age groups.

o Service Target Ratio

The service target ratio of 1 physiotherapist to 3,000 population has been developed. The basis for its development include considering the established Canadian Medical Association (C.M.A.) ratio of 1 physiotherapist to 4,000 population, determining that current population ratios are almost meeting the suggested C.M.A. ratio, comparing that Ontario has a ratio of 1 physiotherapist to 3,300 population in 1980 and realizing that the actual need for physiotherapy services is growing and being recognized. Factors contributing to this requirement include the increased utilization of physiotherapists in rehabilitation in-patient and out-patient services, the requirement of physiotherapy services in developing areas of health care such as respiratory medicine, the trend toward home care programs, the increased proportion of elderly people to population and a recognized need for additional services to meet the requirement of the elderly.

Sensitivity Analysis

Sensitivity analysis has been used on both supply and requirement assumptions to determine the effect on net manpower requirements.

o Supply

Should the impact of the change in policy of the Canadian Physiotherapy Association not be as significant or the western provinces take steps to maintain the 1980 levels of immigration, the net manpower situation would change substantially therefore effecting training recommendations. The net effect would be an increase in supply of approximately an additional 25 physiotherapists a year in British Columbia, 2 a year in Alberta, 5 a year in Saskatchewan and 1 a year in Manitoba. For British Columbia the situation would change from a

substantial requirement for physiotherapists by the year 2000 to a small surplus. Therefore an increase in the number of physiotherapists graduating from training programs in British Columbia would not be required. In Alberta, the effect would not be as substantial as the historical immigration levels have been lower, as a result an increase in training is still required. In Saskatchewan, an additional 5 physiotherapists a year through immigration would reduce the need of 12 physiotherapists a year to 6, in order to reach the service target requirement by the year 2000. In Manitoba, the addition of 1 physiotherapist a year through immigration would reduce the net manpower requirement by approximately 17 and therefore a small increase in the training program would still be required to meet the service target ratio by the year 2000.

- Requirements

An analysis of maintaining a service target ratio of 1:4,000 was used to determine the effect on manpower requirements. For British Columbia, a surplus of 363 physiotherapists would develop if the utilization of physiotherapists was changed to meet this ratio. In Alberta a requirement would exist similar to that determined under the population ratio approach. Saskatchewan would realize a requirement of about double that determined under the population ratio approach. In Manitoba a surplus of approximately 12 physiotherapists would develop.

Table XVII.1.1

Province: BRITISH COLUMBIA
Occupation: PHYSIOTHERAPISTS

Year	Number of Practitioners	Population to Manpower
1973	679	1: 3410
1974	776	1: 3090
1975	859	1: 2860
1976	936	1: 2610
1977	918	1: 2720
1978	1021	1: 2480
1979	1124	1: 2290
1980	1225	1: 2140

Source: ASSOCIATION OF PHYSIOTHERAPISTS AND MASSAGE PRACTITIONERS OF BRITISH COLUMBIA (A.P.M.P.B.C.)

THE DATA IS AN ESTIMATE OF ACTIVE PHYSIOTHERAPISTS

Table XVII.1.2

Factors Affecting Manpower Supply

Province: BRITISH COLUMBIA
Occupation: PHYSIOTHERAPISTS

Factor	Assumption	Source
Opening Stock	1225	A.P.M.P.B.C.[2]
Net Migration	40 for all years	A.P.M.P.B.C.
Net Immigration	53 for 1982-1982 28 for remaining	A.P.M.P.B.C.
Net Occupational Shift[1]	-5% of opening stock	A.P.M.P.B.C.
Training Output	28 for 1981-1985 18 for remaining	U. of B.C.[3]
Attrition	Actual Retirement	H.M.R.U.[4]

Notes:

[1] Includes Active/Inactive Flows

[2] Association of Physiotherapists and Massage Practitioners of British Columbia (A.P.M.P.B.C.)

[3] University of British Columbia

[4] Health Manpower Research Unit (H.M.R.U.), Division of Health Services Research and Development, Health Services Centre, University of British Columbia

PROVINCIAL ASSUMPTIONS

BRITISH COLUMBIA

a) Legal Controls

The Physiotherapists Act (R.S. Chapter 327-1979), is the act regulating the practice of physiotherapy in the province of British Columbia. The certification and licensing requirements are shown in Appendix III - Scope and Control of Practice.

b) Assumptions

Table XVII.1.1, opposite, indicates the total number of physiotherapists in British Columbia identified as active.

o Factors Affecting Manpower Supply

The assumptions made with respect to each of the factors which have the potential to affect manpower supply are shown in Table XVII.1.2, opposite. These factors include migration, immigration, active to inactive movements, training output and retirement. For each assumption, the information source has been identified. The age distribution for active physiotherapists is shown in Table XVII.1.3.

o Confidence in Factors Affecting Manpower Supply

The assumptions made on manpower supply were developed from information published in Report R:11, from the Health Manpower Research Unit (HMRU) and from regular annual reports made by the Association of Physiotherapists and Massage Practitioners of British Columbia. The active stock is considered to be accurate as all physiotherapists must register with the association. Records are kept on movement patterns therefore estimates made on migration, immigration and movement to and from inactive are reasonable. The average movement between active to

TABLE XVII.1.3

PHYSIOTHERAPISTS IN BRITISH COLUMBIA BY AGE

AGE GROUP	MALE	FEMALE	TOTAL
21 - 30	21	213	234
31 - 40	34	251	285
41 - 50	15	102	117
51 - 60	9	68	77
61 - 65	3	68	71
Over 65	3	8	11
Total	85	710	795

Source: Health Manpower Research Unit, Division of Health Services Research and Development, University of British Columbia.

The age distribution was taken in 1979. It does not include physiotherapists who were not on record with the H.M.R.U. in 1979.

TABLE XVII.1.4

NET MANPOWER REQUIREMENTS

BRITISH COLUMBIA
OCCUPATION: PHYSIOTHERAPISTS

YEAR	PROJECTED STOCK	PROJECTED REQUIREMENT	
		POPULATION RATIO[1]	SERVICE TARGET RATIO[2]
1981	1274	1249	891
		Net -25	-383
1982	1320	1275	910
		Net -45	-410
1983	1336	1300	928
		Net -36	-408
1984	1350	1326	947
		Net -24	-403
1985	1364	1352	965
		Net -12	-399
1990	1364	1480	1056
		Net 116	-308
1995	1366	1595	1138
		Net 229	-228
2000	1333	1695	1210
		Net 362	-123

Note: 1- POPULATION RATIO
1:2,141
2- SERVICE TARGET RATIO
1:3,000

inactive is based on -5%, which has been the average movement in British Columbia over the last few years. The training figures assume the combined physiotherapy/occupational therapy program will be split in 1982. This is based on information obtained from the University of British Columbia. Specific age distributions for physiotherapists were obtained, therefore projections for retirement at the age of 65 were determined.

o Estimating Requirements

. Historical Ratio

The current ratio of physiotherapists to population is 1:2,143, was used to project the number of physiotherapists required in the future to maintain the current level of manpower.

. Service Target Ratio

The service target ratio of 1:3,000 has been used to estimate requirements for physiotherapists in British Columbia.

o Net Manpower Requirement

The net manpower requirements under each projection approach are shown in Table XVII.1.4, opposite. The most likely scenario is based on a population ratio of 1:2,143 under the medium population projection.

Table XVII.2.1

Province: ALBERTA
Occupation: PHYSIOTHERAPISTS

Year	Number of Practitioners	Population to Manpower
1978	474	1: 4120
1979	420	1: 4810
1980	499	1: 4170

Source: ASSOCIATION OF CHARTERED PHYSIOTHERAPISTS OF ALBERTA (A.C.P.A.)

THE DATA IS AN ESTIMATE OF ACTIVE PHYSIOTHERAPISTS

Table XVII.2.2

Factors Affecting Manpower Supply

Province: ALBERTA
Occupation: PHYSIOTHERAPISTS

Factor	Assumption	Source
Opening Stock	499	A.C.P.A.[2]
Net Migration	2 for all years	A.C.P.A.
Net Immigration	5 for 1981-1982 3 for remaining	A.C.P.A.
Net Occupational Shift[1]	-5% of stock	ESTIMATE[3]
Training Output	35 for all years	U. OF A.[4]
Attrition	Actual Retirement	A.C.P.A.

Notes:

[1] Includes Active/Inactive Flows

[2] ASSOCIATION OF CHARTERED PHYSIOTHERAPISTS OF ALBERTA (A.C.P.A.)

[3] ESTIMATE MADE FROM ACTUAL RECORDS KEPT BY THE ASSOCIATION OF PHYSIOTHERAPISTS AND MASSAGE PRACTITIONERS OF BRITISH COLUMBIA (A.P.M.P.B.C.)

[4] UNIVERSITY OF ALBERTA

PROVINCIAL ASSUMPTIONS

ALBERTA

a) Legal Controls

The Chartered Physiotherapists Act (R.S.A. 1955, c. 233, S.1), is the act regulating practice of physiotherapy in the province of Alberta. The certification and licensing requirements are shown in Appendix III - Scope and Control of Practice.

b) Assumptions

Table XVII.2.1, opposite, indicates the total number of physiotherapists in Alberta identified as active.

o Factors Affecting Manpower Supply

The assumptions made with respect to each of the factors which have the potential to affect manpower supply are shown in Table XVII.2.2, opposite. These factors include migration, immigration, active to inactive movements, training output and retirement. For each assumption, the information source has been identified. The age distribution of active physiotherapists is shown in Table XVII.2.3.

o Confidence in Factors Affecting Manpower Supply

The assumptions made on manpower supply were developed from estimates made by the association. The active stock includes the number of physiotherapists indicated as active in the association and a proportion of physiotherapists not members but considered active. No records are kept on movements from immigration, migration or active to inactive, therefore assumptions were developed on estimates. The active to inactive movement of -5% was used based on the movement determined from actual records in British Columbia. The training

TABLE XVII.2.3

PHYSIOTHERAPISTS IN ALBERTA BY AGE

AGE GROUP	TOTAL
20 - 24	67
25 - 29	79
30 - 34	44
35 - 39	18
40 - 44	23
45 - 49	12
50 - 54	6
55 - 59	4
60 - 64	2
65 and over	2
Unknown	253
Total	499

Source: The Association of Chartered Physiotherapists of Alberta.

The totals include age distributions for active physiotherapists on record in the association. The totals do not include physiotherapists who are not members of the association.

TABLE XVII.2.4

MANPOWER REQUIREMENTS

ALBERTA
OCCUPATION: PHYSIOTHERAPY

YEAR	PROJECTED STOCK	PROJECTED REQUIREMENT	
		POPULATION RATIO[1]	SERVICE TARGET RATIO[2]
1981	515	516	718
		Net 1	203
1982	530	536	746
		Net 6	216
1983	543	557	775
		Net 14	232
1984	555	577	803
		Net 22	248
1985	566	595	827
		Net 29	261
1990	614	678	943
		Net 64	329
1995	646	757	1053
		Net 111	407
2000	658	835	1162
		Net 177	504

Note: 1- POPULATION RATIO
1:4,172

2- SERVICE TARGET RATIO
1:3,000

figures were based on information from the University of Alberta. Specific age distributions were determined from association records. Retirement at 65 has been projected using this information.

o Estimating Requirements

. Historical Ratio

The current ratio of physiotherapists to population is 1:4,172, was used to project the number of physiotherapists required in the future to maintain the current level of manpower.

. Service Target Ratio

The service target ratio of 1:3,000 has been used to estimate requirements for physiotherapists in Alberta.

o Net Manpower Requirement

The net manpower requirements under each projection approach are shown in Table XVII.2.4, opposite. The most likely scenario is based on a service target ratio of 1:3,000 under the medium population projection.

Table XVII.3.1

Province: SASKATCHEWAN
Occupation: PHYSIOTHERAPISTS

Year	Number of Practitioners	Population to Manpower
1975	110	1: 8340
1976	162	1: 5690
1977	181	1: 5180
1978	174	1: 5450
1979	189	1: 5060
1980	210	1: 4590

Source: SASKATCHEWAN PHYSICAL THERAPISTS ASSOCIATION (S.P.T.A.)

THE DATA IS AN ESTIMATE OF ACTIVE PHYSIOTHERAPISTS

Table XVII.3.2

Factors Affecting Manpower Supply

Province: SASKATCHEWAN
Occupation: PHYSIOTHERAPISTS

Factor	Assumption	Source
Opening Stock	210	S.P.T.A.[2]
Net Migration	-10 for all years	S.P.T.A.
Net Immigration	10 for 1981-1982 5 for remaining	S.P.T.A.
Net Occupational Shift[1]	-5% of opening stock	ESTIMATE[3]
Training Output	18 for all years 25 for 1984 only	U. OF S.[4]
Attrition	Zero for 1981-1988 2 for remaining	S.P.T.A.

Notes:

[1] Includes Active/Inactive Flows

[2] SASKATCHEWAN PHYSICAL THERAPIST ASSOCIATION (S.P.T.A.)

[3] ESTIMATE, MADE FROM ACTUAL RECORDS KEPT BY THE ASSOCIATION OF PHYSIOTHERAPISTS AND MASSAGE PRACTITIONERS OF BRITISH COLUMBIA (A.P.M.P.B.C.)

[4] UNIVERSITY OF SASKATCHEWAN

PROVINCIAL ASSUMPTIONS

SASKATCHEWAN

a) Legal Controls

The Physical Therapist Act, (Chapter P-11) is the act regulating the practice of physiotherapy in the province of Saskatchewan. The certification and licensing requirements are shown in Appendix III - Scope and Control of Practice.

b) Assumptions

Table XVII.3.1, opposite, indicates the total number of physiotherapists in Saskatchewan identified as active.

o Factors Affecting Manpower Supply

The assumptions made with respect to each of the factors which have the potential to affect manpower supply are shown in Table XVII.3.2 (opposite). These factors include migration, immigration, active to inactive movements, training output and retirement. For each assumption, the information source has been identified.

o Confidence in Factors Affecting Manpower Supply

The assumptions made on manpower supply were developed from estimates made by the association. The active stock includes the number of physiotherapists indicated as active in the association. No records are kept on movements from immigration, migration or active to inactive, therefore assumptions were developed on estimates. The active to inactive movement of -5% was used based on the movement determined from actual records in British Columbia. The training figures were based on information from the University of Saskatchewan. Specific age distributions are not kept for physiotherapists by the

TABLE XVII.3.4

NET MANPOWER REQUIREMENTS

SASKATCHEWAN
OCCUPATION: PHYSIOTHERAPY

YEAR	PROJECTED STOCK	PROJECTED REQUIREMENT	
		POPULATION RATIO[1]	SERVICE TARGET RATIO[2]
1981	218	213	326
		Net -5	108
1982	225	216	330
		Net -9	105
1983	227	219	335
		Net -8	108
1984	236	222	340
		Net -14	104
1985	237	225	345
		Net -12	108
1990	238	241	369
		Net 3	131
1995	233	255	390
		Net 22	157
2000	230	267	409
		Net 37	179

Note: 1- POPULATION RATIO
1:4,591

2- SERVICE TARGET RATIO
1:3,000

association. Estimates on retirement were made by the association and projected retirements over the time period.

o Estimating Requirements

. Historical Ratio

The current ratio of physiotherapists to population is 1:4,594, was used to project the number of physiotherapists required in the future to maintain the current level of manpower.

. Service Target Ratio

The service target ratio of 1:3,000 has been used to estimate requirements for physiotherapists in Saskatchewan.

o Net Manpower Requirement

The net manpower requirements under each projection approach are shown in Table XVII.3.4, opposite. The most likely scenario is based on a service target ratio of 1:3,000 under the medium population projection.

Table XVII.4.1

Province: MANITOBA
Occupation: PHYSIOTHERAPISTS

Year	Number of Practitioners	Population to Manpower
1977	217	1: 4740
1978	232	1: 4450
1979	246	1: 4260
1980	246	1: 4290

Source: ASSOCIATION OF PHYSIOTHERAPISTS OF MANITOBA (A.P.M.)

THE DATA IS AN ESTIMATE OF ACTIVE PHYSIOTHERAPISTS

Table XVII.4.2

Factors Affecting Manpower Supply

Province: MANITOBA
Occupation: PHYSIOTHERAPISTS

Factor	Assumption	Source
Opening Stock	246	A.P.M.[2]
Net Migration	-2 for all years	A.P.M.
Net Immigration	2 for 1981-1985 1 for remaining	A.P.M.
Net Occupational Shift[1]	-5% of opening stock	ESTIMATE[3]
Training Output	20 for all years	U. OF M.[4]
Attrition	Actual Retirement	A.P.M.

Notes:

[1] Includes Active/Inactive Flows

[2] ASSOCIATION OF PHYSIOTHERAPISTS OF MANITOBA (A.P.M.)

[3] ESTIMATE, MADE FROM ACTUAL RECORDS KEPT BY THE ASSOCIATION OF PHYSIOTHERAPISTS AND MASSAGE PRACTITIONERS OF BRITISH COLUMBIA (A.P.M.P.B.C.)

[4] UNIVERSITY OF MANITOBA

PROVINCIAL ASSUMPTIONS

MANITOBA

a) Legal Controls

The Physiotherapists Act (S.M. 1980-81, C. 15, Cap. P. 65), is the act regulating the practice of physiotherapy in the province of Manitoba. The certification and licensing requirements are shown in Appendix III - Scope and Control of Practice.

b) Assumptions

Table XVII.4.1, opposite, indicates the total number of physiotherapists in Manitoba identified as active.

o Factors Affecting Manpower Supply

The assumptions made with respect to each of the factors which have the potential to affect manpower supply are shown in Table XVII.4.2, opposite. These factors include migration, immigration, active to inactive movements, training output and retirement. For each assumption, the information source has been identified. The age distribution for active physiotherapists is shown in Table XVII.4.3.

o Confidence in Factors Affecting Manpower Supply

The assumptions made on manpower supply were developed from estimates made by the association. The active stock includes the number of physiotherapists indicated as active in the association. No records are kept on movements from immigration, migration or active to inactive, therefore assumptions were developed on estimates. The active to inactive movement of -5% was used based on the movement determined from actual records in British Columbia. The training figures were based on information from the University of Manitoba

TABLE XVII.4.3

PHYSIOTHERAPISTS IN MANITOBA BY AGE

AGE GROUP	MALE	FEMALE	TOTAL
20 - 24	1	36	37
25 - 29	14	83	97
30 - 34	9	46	55
35 - 39	3	20	23
40 - 44	-	10	10
45 - 49	2	6	8
50 - 54	-	4	4
55 - 59	2	3	5
60 - 64	3	2	5
65 and over	-	2	2
Unknown	-	-	-
Total	34	212	246

Source: The Association of Physiotherapists of Manitoba.

The totals include the age distribution for active physiotherapists in the association.

TABLE XVII.4.4

MANPOWER REQUIREMENTS

MANITOBA
OCCUPATION: PHYSIOTHERAPY

YEAR	PROJECTED STOCK	PROJECTED REQUIREMENT	
		POPULATION RATIO[1]	SERVICE TARGET RATIO[2]
1981	252	248	354
		Net -4	102
1982	258	249	356
		Net -9	98
1983	263	251	358
		Net -12	95
1984	268	252	361
		Net -16	93
1985	273	254	363
		Net -19	90
1990	293	262	375
		Net -31	82
1995	309	270	385
		Net -39	76
2000	320	275	393
		Net -45	73

Note: 1- POPULATION RATIO
1:4,286

2- SERVICE TARGET RATIO
1:3,000

program. Specific age distributions were determined from association records. Retirement at 65 has been projected using this information.

o Estimating Requirements

. Historical Ratio

The current ratio of physiotherapists to population is 1:4,286, was used to project the number of physiotherapists required in the future to maintain the current level of manpower.

. Service Target Ratio

The service target ratio of 1:3,000 has been used to estimate requirements for physiotherapists in Manitoba.

o Net Manpower Requirement

The net manpower requirements under each projection approach are shown in Table XVII.4.4, opposite. The most likely scenario is based on a service target ratio of 1:3,000 under the medium population projection.

APPENDIX III - SCOPE OF PRACTICE

PHYSIOTHERAPIST: CONTROL OF PRACTICE

PROVINCE	CERTIFICATION/LICENSING/REGISTRATION		
	REQUIRED CHARACTERISTICS OF APPLICANTS	CERTIFICATION REQUIREMENTS	LICENSING REQUIREMENTS
British Columbia Chapter 327			Physiotherapists Act. Membership as a chartered physiotherapist is available to the person who: . On April 14, 1954, was registered as a chartered physiotherapist and was practising physiotherapy in the Province; or . Having become a member of any of Her Majesty's Forces or of any of the Forces of an ally of Her Majesty, was at that time a member in good standing of the Canadian Physiotherapy Association (Incorporated), who makes application in writing to the minister within 6 months of his discharge; . is 19 years of age or older; . is a graduate of a school of physiotherapy approved by the minister under section 22; . has passed the examination prescribed by the board of examiners for chartered physiotherapists. Membership as a registered physiotherapist is available to the person who: . On April 14, 1954, was registered as a registered physiotherapist and was practising physiotherapy in the Province; or

PROVINCE	CERTIFICATION/LICENSING/REGISTRATION		
	REQUIRED CHARACTERISTICS OF APPLICANTS	CERTIFICATION REQUIREMENTS	LICENSING REQUIREMENTS
British Columbia Chapter 327			. Having become a member of a any of Her Majesty's Forces or of any of the Forces of an ally of Her Majesty, was at that time a member in good standing of the British Columbia Society of Physiotherapy and Massage Practitioners, who makes application in writing to the minister within 6 months of his discharge; . has taken a 3 year course of not less than 9 working months in each year and not less than 30 hours weekly in each month in a school approved by the minister for this Part and has graduated from the school; . has passed the examination prescribed by the board of examiners for physiotherapists.

PHYSIOTHERAPIST: CONTROL OF PRACTICE

PROVINCE	CERTIFICATION/LICENSING/REGISTRATION		
	REQUIRED CHARACTERISTICS OF APPLICANTS	CERTIFICATION REQUIREMENTS	LICENSING REQUIREMENTS
Alberta Chapter 43			The Chartered Physiotherapists Act. Membership is available to: . all members of the Canadian Physiotherapy Association and all graduates in physiotherapy of a Provincial university; or . all others who have educational qualifications at least the equivalent of those required for graduation in physiotherapy from a Provincial university, and who have not been removed for cause from the register of any physiotherapy association, or institute, or college or any similar body in Canada or elsewhere; or . a person who produces a certificate from the Universities Co-ordinating Council indicating they have satisfied the determined educational qualifications.

PHYSIOTHERAPIST: CONTROL OF PRACTICE

PROVINCE	CERTIFICATION/LICENSING/REGISTRATION		
	REQUIRED CHARACTERISTICS OF APPLICANTS	CERTIFICATION REQUIREMENTS	LICENSING REQUIREMENTS
Saskatchewan Chapter P-11			The Physical Therapists Act. Membership is available: . in the discretion of the council, any person who was engaged in actual practice as a physical therapist in the province for a period of ten years or more immediately prior to the first day of April, 1945, and who has furnished evidence of qualifications and moral character satisfactory to the council; . in the discretion of the council, any person who is a member in good standing of the Canadian Physiotherapy Association; . any person registered with or who is a member in good standing of an incorporated body or organization in any other province or country if that body or organization is empowered to register or receives as member qualified physical therapists and if the council and The University of Saskatchewan are satisfied that the academic standards fixed by that body or organization for the registration or admission of members are at least equivalent to those prescribed under this Act for the purpose of registration; and . any other person who is a graduate from a school or college, approved by the council and The University of Saskatchewan pursuant to this Act. R.S.S. 1965, c. 322, s.8.

PHYSIOTHERAPIST: CONTROL OF PRACTICE

PROVINCE	CERTIFICATION/LICENSING/REGISTRATION		
	REQUIRED CHARACTERISTICS OF APPLICANTS	CERTIFICATION REQUIREMENTS	LICENSING REQUIREMENTS
Manitoba Chapter 15			Physiotherapists Act. Membership is available to a person who: . is a graduate of a physiotherapy education program approved by the board; or . has passed the examinations prescribed by the board; or . is registered with, or is a member in good standing of, a body or organization in any other province, territory or country where the body or organization is empowered to register or receive as members, physiotherapists and the board is satisfied that the academic standards fixed by that body or organization for the registration or admission of members are at least equivalent to those prescribed under this Act for the purpose of registration; or . every person who is engaged, directly or indirectly in the practice of physiotherapy as described in clause 7 (2)(d).

APPENDIX IV - BIBLIOGRAPHY

REPORTS

The Adhoc Committee to Investigate and Make Recommendations on the Manpower Requirements for Physiotherapists in Manitoba, The Report of the Adhoc Committee to Investigate and Make Recommendations on the Manpower Requirements for Physiotherapists in Manitoba for the Association of Physiotherapists of Manitoba, 1977.

The Canadian Physiotherapy Association, Scope of Practice, 1980.

The Canadian Physiotherapy Association and the Association of Chartered Physiotherapists of Alberta, Staff Shortage Comittee, Report on Physiotherapy Staff Shortages in Alberta, 1981.

Division of Health Services Research and Development, University of British Columbia, Physiotherapy Manpower in British Columbia, 1979, Survey of Registrants of the Association of Physiotherapists and Massage Practitioners of British Columbia, 1979 with 1977 Comparison, Report R:14, August 1980.

Ontario Physiotherapy Association and Agnew Peckham and Associates Ltd., Physiotherapy Ontario, February 1980.

Statistics Canada, Health Division, Canadian Schedule of Unit Values for Physiotherapy, 1977.

Statistics Canada, Health Division.

Canadian Schedule of Unit Values for Physiotherapy, 1977

Profile of Physiotherapists in Canada, 1972 to 1975, July 1979.

Health Manpower Physiotherapists, 1978, October 1979.

ARTICLES AND REVIEWS

Hitchens, M.; and Martin, M.H., To the Board of Directors, Canadian Physiotherapy Association, Review of Physiotherapists Case Load Standards, October 25, 1979 (Revised March 25, 1980).

O'Neill, M.T., "Physiotherapists Case Load Standards", Physiotherapy Canada, Vol. 28, No. 2, May 1976.

PROVINCIAL HEALTH MANPOWER REFERENCE SOURCES

BRITISH COLUMBIA

- Rollcall 79 - A Status Report of Health Personnel in the Province of British Columbia.
  Report R:12
  Division of Health Services Research and Development
  Health Sciences Centre,
  University of British Columbia.

- Rollcall Update 80 - A Status Report of Selected Health Personnel in the Province of British Columbia.
  Report R:16
  Division of Health Services Research and Development
  Health Sciences Centre,
  University of British Columbia.

ALBERTA

Health and Social Service Manpower in AIberta 1980

Alberta - Health and Social Services
Disciplines Committee.

SASKATCHEWAN

Annual Report 1978 - Saskatchewan Health Manpower

Saskatchewan Health.

MANITOBA

Health Manpower Provincial Report - Manitoba 1980.

Manitoba - Department of Health
Research Section.

Province of
British Columbia

Province of
Alberta

Province of
Saskatchewan

Province of
Manitoba

WESTERN CANADA
HEALTH MANPOWER TRAINING STUDY

Category # 3 Report XVIII

RADIOLOGICAL TECHNICIANS
(X-Ray Technicians)

REPORT XVIII

X-RAY TECHNICIANS

THE REQUIREMENT FOR ALTERNATIVE TRAINING AND FUNDING ARRANGEMENTS IN WESTERN CANADA

REPORT XVIII

X-RAY TECHNICIANS

TABLE OF CONTENTS

PAGE

I. INTRODUCTION

Study Background..... 1
Study Objectives..... 1
Study Approach..... 2
Occupation Definition..... 4

II. TRAINING NEEDS IN WESTERN CANADA

Manpower Requirements..... 5
Existing Training Programs..... 6
Occupational Issues..... 6

III. TRAINING RESPONSES

Decision Process..... 9
Timing and Location of Manpower Requirement..... 9
Indicated Manpower Responses.....10
Defined Alternative Locations.....13

IV. RECOMMENDATIONS.....14

APPENDIX I - Study Approach and Methodology
APPENDIX II - Provincial Net Manpower Requirement
APPENDIX III - Scope of Practice
APPENDIX IV - Bibliography

I. INTRODUCTION

STUDY BACKGROUND

The provision of effective health services to the community is, to a considerable degree, dependent on three essential resources:

- an adequate supply of well trained specialist staff in each health occupation group
- the development of adequate facilities to service the community
- the availability of adequate funds to ensure cost-effective and efficient health services.

The range and complexity of health treatment programs has expanded greatly in Canada during the last twenty-five years. In addition, changing technology and the development of new treatment programs have resulted in an increased requirement for skilled, adequately trained health manpower. These factors have resulted in an increased emphasis on manpower planning and skill training for health occupations to ensure an adequate supply of trained practitioners to meet defined manpower requirements.

STUDY OBJECTIVES

The Western Canada Health Manpower Training Study was initiated by the western Premiers at their annual conference in 1980. The study terms of reference contain two major objectives. These are:

- to assess the existing and future needs for health manpower training programs and facilities in western Canada

- to make recommendations for the rationalization of the location and funding of health manpower training programs and facilities in western Canada.

STUDY APPROACH

The study was under the direction of a Steering Committee consisting of health and education representatives from the Provinces of British Columbia, Alberta, Saskatchewan and Manitoba. The study took place over two years and consisted of a review of 26 health occupations grouped into five categories. Each occupation has been studied separately, and a report has been produced for each. In addition, a report examining the inter-relations of the occupations has been submitted to the Steering Committee.

Data was collected from provincial and national associations and from government agencies for each of the occupations on the numbers of individuals registered with the associations and their current status as active or inactive practitioners. An attempt was also made to gather data on historical trends, the number of graduates from training, trends in movement of active practitioners to inactive status, occupational shifts out of the profession, trends in migration to and from other provinces, and immigration and emigration.

In the cases where validated and reliable information was not available, association spokesmen, employers and individuals in each of the occupations were interviewed to provide qualitative opinions regarding present and future trends affecting the manpower supply and requirement.

A literature review was conducted to examine the problems facing the occupation. A bibliography of the material reviewed is contained in Appendix IV.

A health manpower computer model was developed to assist in the preparation of projections on the future supply and requirement for each occupation. A critical analysis of these twenty-year projections was then undertaken to develop the various supply and requirement scenarios presented in this report.

Separate documents describing the manpower planning methodology and the training decision-making process were issued. A brief summary of the overall study approach and methodology is set out in Appendix I and details of the provincial net requirements are set out in Appendix II.

OCCUPATION DEFINITION

This report addresses the need for training programs for x-ray technicians in each of the four provinces. An x-ray technician performs either diagnostic or therapeutic activities.

For the purpose of this study an x-ray technician (diagnostic) is an individual who:

"operates radiography equipment to produce pictures of body structures for diagnostic purposes. Explains treatment and reassures patients. Prepares drugs and chemicals for radiologist. Positions patient according to part of body being x-rayed. Affixes shields to protect unaffected areas of patient from radiation. Adjusts equipment controls to collimate beam, to regulate length and intensity of x-ray exposure and to expose film. Processes and prepares films for interpretation by radiologist. Assists radiologist in fluoroscopy, cinefluoroscopy and other diagnostic procedures. Operates radiography equipment in operating theatre or other specialized area to assist physician or surgeon."[1]

An x-ray technician (therapy) is an individual who:

"administers radiation treatment to patients as prescribed by radiation oncologist. Explains treatment and reassures patient. Positions patient according to part of body being treated. Affixes shields to protect unaffected areas of patient from radiation. Adjusts equipment controls to collimate and direct radiation beam. Observes patient through window or on closed circuit television during treatment. Notifies radiation oncologist if medical problems arise. Assists clinical physician to prepare patient's treatment plan according to radiation oncologist's prescription. Prepares or assists in preparation of sealed radioactive substances for surface application or insertion into body cavities."[2]

The report does not analyze the manpower needs for nuclear medicine or ultrasound practitioners.

1. Canadian Classification and Dictionary of Occupations, No. 3155, 1980 Revision.

2. Ibid., No. 3155.

EXHIBIT 1

MANPOWER REQUIREMENTS

WESTERN CANADA, X-RAY TECHNICIANS

(BASED ON MOST LIKELY SCENARIO FROM EACH PROVINCE)

YEAR	PROJECTED STOCK	PROJECTED REQUIREMENT
1981	2,291	2,416
	NET	125
1982	2,224	2,471
	NET	247
1983	2,163	2,530
	NET	367
1984	2,108	2,587
	NET	479
1985	2,059	2,641
	NET	582
1990	1,858	2,899
	NET	1,041
1995	1,738	3,136
	NET	1,398
2000	1,641	3,357
	NET	1,716

II - TRAINING NEEDS IN WESTERN CANADA

This section presents the statistical data for manpower requirements for western Canada, reviews the basis for projection and the confidence in basic data, outlines existing training programs for x-ray technicians (both diagnostic and therapeutic), and reviews the major issues influencing the occupation.

MANPOWER REQUIREMENTS

Exhibit 1, opposite, shows the projected stock and requirement for x-ray technicians during the period 1981 - 2000. These projections are based on the most likely scenario derived for each province, and show an average annual requirement of 90 additional practitioners throughout the forecast period.

Methodology

For each province, the most likely scenario has been based on the medium population projection, and the population ratio approach.

There is no identified service target information for this occupation, and the available utilization data does not provide a comprehensive record of services by age and sex of recipient.

Degree of Confidence in Data

Projections of manpower supply have been prepared based on current manpower stock, net migration, net immigration, occupational shift including active/inactive movements, training outputs and attrition. Data was obtained from each provincial association, and from the Canadian Association of Medical Radiation Technologists (C.A.M.R.T.). However, registration in either provincial or national associations is not mandatory for employment.

TABLE I

EXISTING TRAINING PROGRAMS - WESTERN CANADA

X-RAY TECHNICIANS

PROVINCE	PROGRAMS	GRADUATES IN 1981
British Columbia:	1	44
Alberta:	1	41[1]
Saskatchewan:	1	19
Manitoba:	1	27

NOTE:

1 This figure is for the program at the Northern Alberta Institute of Technology. In addition, training is provided at the W.W. Cross Cancer Institute and the Southern Alberta Cancer Clinic. These training figures are

Therefore, the data obtained could be underestimated on all factors. The provincial associations estimated the number of technicians who belonged to their association or to C.A.M.R.T. Opening stock numbers were adjusted to include all active technicians in the province, and are acceptably accurate. The stock figures do not include ultra sound or nuclear medicine technicians, however. From a forecasting viewpoint, the accuracy of the data utilized is adequate.

The assumptions made for manpower supply are shown in Appendix II.

EXISTING TRAINING PROGRAMS

The existing training programs for x-ray technicians are shown in Table I, opposite.

A more detailed discussion of these training programs is contained in Report 3-A, "The Scope of Existing Training Programs Category III - Occupations". The western region trains therapeutic technicians in hospitals and clinics, plus Manitoba has a program at Red River College which graduated 3 students in 1980.

OCCUPATIONAL ISSUES

Several trends and issues will affect x-ray technicians in the forecast period. These are:

- Specialization

  There is an increasing technical sophistication in the work, which results in increased specialization. Training for the new equipment, such as C.A.T. scanners, is often conducted on-the-job. Training for specialized procedures such as ultra sound are conducted primarily on-

the-job. This trend toward increased sophistication and specialization results in the need for on-going upgrading training and continuing education.

- o More Specialist Positions

There is an increase in the number of specialized positions for ultra sound and nuclear medicine. The work is considered to be cleaner and more interesting than the regular duties of an x-ray technician. A higher technical competence is required but it is often developed on-the-job. Although the number of specialists is smaller than the number of x-ray technicians, it is difficult to predict whether the requirement for specialists will increase significantly in the future, and if growth will occur in existing areas or in new areas yet to be defined.

- o More Equipment

There is an increase in the purchase of equipment by hospitals, which has an impact on the requirement for technicians to operate the equipment.

- o Female Practitioners

It is estimated that approximately 80% of x-ray technicians in western Canada are female. Data is not available on the number of males entering training, and consequently no attempt has been made to estimate the future composition of the workforce.

o Pattern of Employment

Based on survey data from the provinces of Alberta and Saskatchewan it is estimated that approximately 85% of x-ray technicians work full-time.

There is no information available on the number of hours worked by part-time employees, and consequently no attempt has been made to calculate full-time equivalent practitioners.

o Non-Specialist Personnel

This refers to the combined x-ray/medical laboratory technician. This individual is trained in basic diagnostic test procedures in both x-ray and laboratory technology. The primary employment opportunities for this occupation are in rural hospitals and clinics where they serve a useful role. No signficant changes are anticipated in the educational programs which train these specialists. It is therefore anticipated that trained combined technicians will continue to service a significant portion of the small institution technician manpower requirements.

Exhibit 2

Net Manpower Requirements by Province and Region

Most Likely Scenario

Occupation: X-RAY TECHNICIANS

Year	British Columbia		Alberta		Saskatchewan		Manitoba		Region	
	Stock	Req	Stock	Req	Stock	Req	Stock	Req	Stock	Req
1981	869	885	770	820	271	287	381	424	2291	2416
Net		16		50		16		43		125
1982	870	903	749	851	260	291	345	426	2224	2471
Net		33		102		31		81		247
1983	871	921	730	885	250	295	313	429	2164	2530
Net		50		155		45		116		366
1984	871	940	713	916	242	299	284	432	2110	2587
Net		69		203		57		148		477
1985	871	958	697	944	235	304	258	435	2061	2641
Net		87		247		69		177		580
1990	867	1049	626	1076	206	324	161	449	1860	2898
Net		182		450		118		288		1038
1995	866	1130	580	1202	190	343	104	461	1740	3136
Net		264		622		153		357		1396
2000	855	1201	541	1326	177	360	70	471	1643	3358
Net		346		785		183		401		1715

III - TRAINING RESPONSES

DECISION PROCESS

The decision process, outlined in Appendix I and discussed in detail in Report C, "A Decision Process To Evaluate the Location of, and Funding Arrangements for Health Occupation Training Programs in Western Canada", was used to evaluate the training implications of the net manpower requirements for x-ray technicians discussed above. This section contains the results of this analysis.

TIMING AND LOCATION OF MANPOWER REQUIREMENT

Exhibit 2, opposite, shows the projected manpower requirement under the most likely scenario for the period 1981 - 2000 for each of the provinces. As the exhibit shows, there is an immediate requirement for additional practitioners in each of the provinces, with Alberta showing the largest requirement. Specific discussion of the net manpower requirement for each province follows:

- British Columbia - has a net requirement for 18 additional practitioners each year throughout the forecast period.

- Alberta - has a net requirement for 50 additional practitioners each year for the first 9 years, and 30 additional practitioners per year for the following 10 years. This requirement is primarily due to the large number of technicians leaving the occupation.

  In addition to the information obtained from the professional association on active registered stock, data from the March 1981 vacancy survey in the province of Alberta, has been used to determine the surplus or requirement for x-ray technicians in Alberta. This

survey indicates that there were 604 budgeted positions in the province. The association indicated that there were 792 registered members in 1980. This indicates that approximately 75% of active registered members of the association were employed, and that there is a large labour market pool of practitioners available. For a further discussion of labour market pool refer to Appendix I below. The large inactive pool is consistent with the indicated low vacancy rate.

The training recommendations for the province of Alberta have been developed on the assumption that the province will wish to maintain this relationship between labour market supply and the number of employed, and train the required number of practitioners to maintain this current balance.

- Saskatchewan - has a need for 10 practitioners per year during the forecast period. This is primarily due to the number of technicians leaving the occupation.

- Manitoba - has a need for 32 additional practitioners per year during the first 9 years, and 11 additional practitioners per year for the following 10 years. This requirement results from the large numbers of technicians leaving the province, and from the number of technicians who leave the profession.

INDICATED MANPOWER RESPONSES

Two different types of training responses are required: refresher and basic training. These are discussed below:

Refresher Training

X-Ray technology is primarily a female dominated occupation, and in the absence of definitive data, estimates have been obtained from provincial associations which indicate that typically technicians work an average of approximately 10 years in the profession. In addition, data from the vacancy survey in the province of Alberta indicates that there are approximately 190 registered technicians who are currently not employed as x-ray technicians. Therefore it is appropriate to develop recruitment and retention strategies to limit the number of individuals who leave active employment.

In addition, however, data from the provincial and national associations indicates that there is a pool of inactive x-ray technicians in each of the provinces in western Canada. The potential for these individuals to return to active employment is not known. It is realistic to anticipate that this pool of inactive practitioners represent a significant source of additional manpower.

Given the rapid rate of technological change it is anticipated that x-ray technicians returning to the active work force should receive some form of refresher training to enhance skills to meet the projected manpower need.

There is no evidence to prove that employers require prospective employees to undergo formal college based refresher training programs. An assumption has been made, based on comments from provincial associations that some form of refresher training mechanism would facilitate the transition from inactive to active practitioner. This would result in a better trained and more confident employee with up-to-date skills.

To meet a manpower requirement, it is cheaper and faster to retrain experienced practitioners than to have individuals new to the occupation go

through the total training program. Given the changing technology, the immediate manpower requirement and the large number of inactive technicians in each province, refresher training mechanisms are an effective and relatively inexpensive method of meeting that manpower need.

Refresher training is not a mandatory requirement for registration with the provincial or national associations and some on-the-job refresher training is currently being conducted. However, the provinces cannot exclusively rely on initiatives by employers to provide the refresher training necessary to encourage inactive technicians back into the work force and in numbers which will meet each province's manpower requirements. It is therefore suggested that each of the provinces provide technical assistance in developing refresher training mechanisms to facilitate inactive practitioners returning to the work force. These mechanisms could include brief sessions on learning new equipment, the development of learning packages for employers to review with the new employees, or a series of evening courses.

Basic Training Programs

Basic training programs for x-ray technicians exist in each province. Expanding the enrolment is one method of producing more graduates. Another method is to improve the student output to input ratio in the basic program. This increase in retention will give the province more graduates without expanding the enrolment. In this occupation, however, each new graduate is required to participate in a clinical program. This means that if graduate numbers are increased, the clinical spaces will have to be increased accordingly.

DEFINED ALTERNATIVE LOCATIONS

The range of alternative locations to provide the training for x-ray technicians is dependent on the cost of the training program. Training for this occupation requires sophisticated equipment and, given the cost involved, utilizing the current program locations is more cost-effective than establishing programs in new locations.

The concept of centralized regional training for x-ray technicians was evaluated as an alternative training strategy. It is not practical to have only one or two provinces supplying the western region with technicians for the following reasons:

- the predominantly female stock might be reluctant to move to another province

- there is no guarantee that the students will return to their home province because often, upon graduation, the technicians are hired by the clinics or hospitals where they undergo the clinical aspect of their training

IV - RECOMMENDATIONS

Recommendations for each of the four provinces are set out below.

- **British Columbia**

.1- That British Columbia develop a refresher mechanism to enrol 20 students.

- **Alberta**

.2- That Alberta develop a refresher mechanism to enrol 25 students.

.3- That Alberta establish a second program to enrol 40 students.

- **Saskatchewan**

.4- That Saskatchewan develop a refresher mechanism to enrol 20 students.

- **Manitoba**

.5- That Manitoba develop a refresher mechanism to enrol 15 students.

.6- That Manitoba expand the enrolment levels in its current training program by 20 students.

. All Provinces

.7- That each province increase the clinical spaces available according to the increase in x-ray technicians produced in that province.

APPENDIX I

STUDY APPROACH AND METHODOLOGY

STUDY APPROACH

Introduction

In order to achieve the study objectives, the work program consists of three key activities. These are:

- the analysis of manpower supply and requirements, and the calculation of net manpower requirements
- the analysis of existing training programs for Western Canada
- the development of recommendations for alternative training locations and funding arrangements

Analysis of Manpower Supply and Requirements

The analysis of manpower supply and requirements is designed to allow for a variety of data inputs, and for different emphasis depending on the occupation under review. A variety of data sources are used including provincial and national associations, health insurance agencies, and provincial health and education departments. In all instances, data is developed independently of previously published sources.

In addition to the basic projection of net manpower requirements, a number of sensitivity analyses have been completed to assess the impact of changed in the factors affecting supply and requirements, prior to developing recommendations for either additional training programs, or expanding existing training programs.

Approaches to Determining Manpower Requirements

The approach developed to determine manpower requirements uses three methods of projection. These are discussed below.

1. Service Utilization Approach

The utilization approach is based on an analysis of the pattern of health service usage. It establishes trends in service utilization and projects these onto future population estimates. There are three steps in the service utilization approach.

Step 1 - Determine Per Capita Utilization Rate

Historical data of the number of services provided, by age and sex of recipient is derived. The number of services per age/sex group is then divided by the population for group in the corresponding year. This results in a per capita utilization rate.

Step 2 - Project Future Service Required

The per capita utilization rate is projected onto the low, medium and high population for each year from 1981 to 2000. This results in an estimate of total future services.

Step 3 - Estimated Number of Practitioners Required

Having determined the total future services, the model projects the number of practitioners required, by assuming a constant level of services per practitioner. The number of services per practitioner is determined by dividing total services by the number of practitioners in the base year. To estimate the required number of practitioners, the model divides total future services required by the number of services per practitioner.

2. Service Target Ratio Approach

Service target ratios reflect a theorectical optimal manpower level required to meet health service requirements in the occupation under review. They are expressed as the ratio of practitioner to population. The service target ratios are derived based on discussion with health authorities, review of published reports, articles and summary of defined health care needs.

3. Population Ratio Approach

Population ratios are derived by dividing the total population at a specific point in time by the number of active practitioners. This results in a ratio of practitioners to population.

These ratios are analysed to determine if any trends exists. to project futuren manpower requirements, the model divides total projected population by the previously determined population ratio.

Summary of Approaches to Projecting Manpower Requirements

The three approaches outlined above have been used for the calculation of manpower requirements for this occupation. The specific application of each approach to this occupation is discussed under General Assumption, Appendix II, following.

Development of Recommendations for Alternative Training Locations and Funding Arrangements

We have developed a decision process to assist in developing recommendations for alternative training location(s) and funding arrangements. This process is designed to allow for the logical, consistent evaluation of a range of training alternatives.

There are seven steps in the decision process:

- Step 1. Analysis of manpower requirements
- Step 2. Identification of the appropriate type(s) of training
- Step 3. Definition of alternative training locations
- Step 4. Evaluation of alternative locations for new programs
- Step 5. Establishment of timing of training program requirement
- Step 6. Recommendation on training action(s) and location(s)
- Step 7. Recommendation on funding alternative(s)

LABOUR MARKET SUPPLY

Labour market supply is the relationship between the estimated number of practitioners registered with the provincial associations, the number of practitioners actually employed and the number of vacant positions. Vacancy survey data (normally collected by provincial governments) will identify the total number of budgeted positions, which is the total of the number currently employed plus vacancies.

Labour market supply is a useful tool to estimate, or determine the employment situation for each occupation. The current supply situation is expressed as total budgeted positions divided by the total number of registered practitioners. This percentage (%) of qualified practitioners who are currently employed will indicate the flexability of the existing labour market.

Typically the flexability of the labour market will reflect vacancy rates. The following table illustrates theoretical labour market situations:

"Tight" labour market - 90% - 95% of practitioners actively employed with a vacancy rate of 12% to 20%.

"Balanced" Labour Market - 80% - 90% of practitioners actively employed with a vacancy rate of 8% to 12%.

"Loose" Labour Market - 70% - 80% of practitioners actively employed with a vacancy rate of 0% to 8%.

APPENDIX II

PROVINCIAL NET MANPOWER REQUIREMENTS

Table XVIII.0.1

Number of Practitioners by Province in Western Canada

Occupation: X-RAY TECHNICIANS

Year	British[1] Columbia	Alberta[2]	Saskatchewan[3]	Manitoba[4]
1973	-	-	182	-
1974	-	-	185	-
1975	528	-	198	306
1976	507	-	204	309
1977	435	687	225	-
1978	529	695	242	390
1979	668	743	255	406
1980	868	792	283	421

Notes:

1 SOURCE: BRITISH COLUMBIA RADIOLOGICAL TECHNICIANS ASSOCIATION

2 SOURCE: ALBERTA ASSOCIATION OF MEDICAL RADIATION TECHNOLOGISTS

3 SOURCE: SASKATCHEWAN SOCIETY OF X-RAY TECHNICIANS

4 SOURCE: MANITOBA SOCIETY OF RADIOLOGICAL TECHNOLOGISTS INC.

Table XVIII.0.2

Factors Affecting Manpower Supply in Western Canada

Occupation: X-RAY TECHNICIANS

Factor	British Columbia	Alberta
Opening Stock	868	792
Net Migration	Zero for all years	2% of opening stock
Net Immigration	Zero for all years	Zero for all years
Net Occupation Shift	-5% of stock	-10% of stock
Training Output	44 for all years	41 for all years
Attrition	Actual Retirement	Actual Retirement

	Saskatchewan	Manitoba
Opening Stock	283	421
Net Migration	-1% of opening stock	-20 for all years
Net Immigration	Zero for all years	3 for all years
Net Occupation Shift	-10% of stock	-10% of stock
Training Output	19 for all years	27 for all years
Attrition	Actual Retirement	-8 for all years

GENERAL ASSUMPTIONS

Manpower Stock

Table XVIII.0.1, opposite, shows the approximate total number of x-ray technicians in Western Canada. It indicates those technicians who are active in their respective provinces as identified by the sources noted at the bottom of the table.

Factors Affecting Manpower Supply

The assumptions made with respect to each of the factors which have the potential to affect manpower stock are shown opposite in Table XVIII.0.2. These factors include migration, immigration, occupational shift, training output, and attrition. The age distribution of practitioners is shown in Table XVIII.0.3. It should be noted that stock has been based on the provincial association estimates of the number of members who are actively registered. For specific discussion refer to provincial assumptions. As a result of these estimates the stock figures will not equate with previously published manpower data.

Estimating Requirements

- Historical Ratio

  For each province, the current ratio of x-ray technicians to population was used to project the number of technicians required in the future to maintain the current level of manpower. The 1980 ratio was consistently selected as it most accurately reflects the current manpower situation.

- Utilization Method

  Information on the number of services per year was available, but only for public clinics and hospitals. It was felt that without more comprehensive data, the utilization approach was less useful than the population ratio method.

TABLE XVIII.0.3

AGE STRUCTURE OF X-RAY TECHNICIANS

BY PROVINCE AND REGION

AGE GROUP	B.C.	ALBERTA	SASK.	MANITOBA	TOTAL #(Alberta)%	
22 - 26	No age breakdown	331	No age breakdown	No age breakdown	331	43
27 - 31		142			142	18
32 - 36		169	Used same age distribution	Used - 8 per year	169	22
37 - 41		49	based on Alberta		49	6
42 - 46		51	age distribution		51	7
47 - 51		19			19	2
52 - 56		7			7	1
57 - 61		9			9	1
Unknown		-				
Total		777			777	100

o Service Target Ratio

There is no generally accepted service target ratio.

Sensitivity Analysis

A sensitivity analysis was conducted to determine the effect of applying a 15 year working life to the occupation in all four provinces. This results in an increase in the manpower requirement in British Columbia and a reduction in the manpower need in Alberta, Saskatchewan and Manitoba. However, as we recommended, the proposed refresher courses still could be useful, and the programs in Alberta and Manitoba still should be expanded. The 15 year working life has not been built into the model as the provinces are experiencing definite working life trends, as shown in Table XVIII.0.2. The provinces should monitor the movement of x-ray technicians from active to inactive status, and adjust the training programs as necessary.

According to the vacancy survey conducted by the Province of Alberta, 20% of x-ray technicians work part-time. If a similar part-time rate were applied to the four provinces, then the requirement for manpower would increase in each province.

Table XVIII.1.1

Province: BRITISH COLUMBIA
Occupation: X-RAY TECHNICIANS

Year	Number of Practitioners	Population to Manpower
1975	528	1: 4650
1976	507	1: 4830
1977	435	1: 5730
1978	529	1: 4780
1979	668	1: 3860
1980	868	1: 3020

Source:

BRITISH COLUMBIA RADIOLOGICAL TECHNICIANS ASSOCIATION

Table XVIII.1.3

Factors Affecting Manpower Supply

Province: BRITISH COLUMBIA
Occupation: X-RAY TECHNICIANS

Factor	Assumption	Source
Opening Stock	868	Estimate[2]
Net Migration	Zero for all years	B.C.R.T.A.[3]
Net Immigration	Zero for all years	B.C.R.T.A.
Net Occupational Shift[1]	-5% of stock	B.C.R.T.A.
Training Output	44 for all years	B.C.I.T.[4]
Attrition	Actual Retirement	Estimate[5]

Notes:

1 Includes Active/Inactive Flows

2 Estimate based on information from provincial and national associations B.C.R.T.A. & C.A.M.R.T

3 B.C.R.T.A. is British Columbia Radiological Technicians Association

4 B.C.I.T. is Registrar British Columbia Institute of Technology

5 Estimate based on age distribution for X-Ray Technicians in Alberta

PROVINCIAL ASSUMPTIONS

BRITISH COLUMBIA

a) Legal Controls

There is no legislation controlling the right of x-ray technicians to practice in British Columbia.

b) Assumptions

o Manpower Stock

Table XVIII.1.1, opposite, shows the approximate number of x-ray technicians in British Columbia. The figures from C.A.M.R.T. have been inflated as the provincial association estimated 85% membership in C.A.M.R.T. The 1980 figure excludes those technicians who are working in other occupations or who are nuclear medicine, ultra sound or combined x-ray/medical laboratory technicians. For the purposes of this study, it has been assumed that the x-ray technicians are working full time.

The age distribution of technicians is shown in percentage terms in Table XVIII.1.2, opposite. The percentages are based on data from the Province of Alberta, the only province with an available age breakdown. Since the total stock is of a similar size in British Columbia and Alberta, it was reasonable to assume that the age breakdown also would be similar.

o Factors Affecting Manpower Supply

The assumptions made with respect to each of the factors which potentially affect manpower stock are shown in Table XVIII.1.3, opposite. For each assumption, the information source has been identified. Comments on each factor are shown below:

TABLE XVIII.1.2

TOTAL NUMBER OF ACTIVE X-RAY TECHNICIANS

IN BRITISH COLUMBIA, BY AGE

AGE GROUP	TOTAL %
22 - 26	43 %
27 - 31	18 %
32 - 36	22 %
37 - 41	6 %
42 - 46	7 %
47 - 51	2 %
52 - 56	1 %
57 - 61	1 %

Note: Age breakdown unavailable. Calculated using same proportion as the age breakdown of members in the Province of Alberta.

Factor	Level of Confidence
• migration	B.C.R.T.A. estimate
• immigration	B.C.R.T.A. estimate
• occupational shift	B.C.R.T.A. estimate of a 20 year working life. The association felt that those individuals who left the occupation returned within a few years.
• training output	Registrar, B.C.I.T. Since it will take over 2 years for graduates to impact the manpower stock, our recommendations have been based upon the graduating years 1984 to 2000.
• attrition	Based on the age distribution of x-ray technicians in the Province of Alberta.

o Estimating Requirements

• Historical Ratio

The current ratio of x-ray technicians to population of 1:3,020 was used to project the number of technicians required in the future to maintain the current level of manpower. This method was the selected manpower scenario.

TABLE XVIII.1.4: MANPOWER REQUIREMENTS

PROVINCE: BRITISH COLUMBIA

OCCUPATION: X-RAY TECHNICIANS

PROJECTED MANPOWER REQUIREMENTS

YEAR	PROJECTED STOCK	POPULATION RATIO 1:3,022 MEDIUM POPULATION
1981	869	885
NET		16
1982	870	903
NET		33
1983	871	921
NET		50
1984	871	940
NET		69
1985	871	958
NET		87
1990	867	1,049
NET		182
1995	886	1,130
NET		264
2000	855	1,201
NET		346

- Utilization Method

  The current number of services per technicians of 1,519 was applied to the projected population of the province to determine future manpower demand. However, as this current number of services did not include private clinics and hospitals, the results were considered incomplete.

o Net Manpower Requirements

Table XVIII.1.4, opposite, shows the net manpower requirements under the most likely scenario. The most likely scenario is based on the population ratio method, under the medium population projection. On the basis of this analysis, there is a small requirement for x-ray technicians throughout the forecast period.

Table XVIII.2.1

Province: ALBERTA
Occupation: X-RAY TECHNICIANS

Year	Number of Practitioners	Population to Manpower
1977	687	1: 2760
1978	695	1: 2810
1979	743	1: 2720
1980	792	1: 2630

Source:

ALBERTA ASSOCIATION OF MEDICAL RADIATION TECHNOLOGISTS

TABLE XVIII.2.2

TOTAL NUMBER OF ACTIVE

X-RAY TECHNICIANS IN ALBERTA BY AGE

AGE GROUP	MALE	FEMALE	TOTAL
22 - 26	-	-	331
27 - 31	-	-	142
32 - 36	-	-	169
37 - 41	-	-	49
42 - 46	-	-	51
47 - 51	-	-	19
52 - 56	-	-	7
57 - 61	-	-	9
Unknown	-	-	-
Total	-	-	777

Source: Alberta Association of Medical Radiation Technologists.

ALBERTA

a) Legal Controls

The Radiological Technicians Act (C.310) controls the right of x-ray technicians to practice in Alberta but the Act is currently not in effect as the Medical Radiological Technicians Board has not been active in recent years.

b) Assumptions

o Manpower Stock

The approximate number of x-ray technicians in Alberta shown in Table XVIII.2.1, opposite. The figures from the provincial association have been inflated as the association estimated 95% membership. The 1980 figure excludes those technicians who are working in other occupations or who are nuclear medicine, ultra sound or combined x-ray/medical laboratory technicians. For the purposes of this study, it has been assumed that the x-ray technicians are working full time. The age distribution of technicians as of July, 1981 is shown in Table XVIII.2.2, opposite.

o Factors Affecting Manpower Supply

The assumptions made with respect to each of the factors which potentially affect manpower stock are shown in Table XVIII.2.3, opposite. For each assumption, the information source has been identified. Comments on each factor are shown below:

Table XVIII.2.3

Factors Affecting Manpower Supply

Province: ALBERTA
Occupation: X-RAY TECHNICIANS

Factor	Assumption	Source
Opening Stock	792	A.A.M.R.T.[2]
Net Migration	2% of opening stock	A.A.M.R.T.
Net Immigration	Zero for all years	A.A.M.R.T.
Net Occupational Shift[1]	-10% of stock	A.A.M.R.T.
Training Output	41 for all years	N.A.I.T.[3]
Attrition	Actual Retirement	A.A.M.R.T.

Notes:

[1] Includes Active/Inactive Flows

[2] A.A.M.R.T. IS ALBERTA ASSOCIATION OF MEDICAL RADIATION TECHNOLOGISTS

[3] N.A.I.T. IS REGISTRAR NORTHERN ALBERTA INSTITUTE OF TECHNOLOGY

Factor	Level of Confidence
. migration	A.A.M.R.T. estimate.
. immigration	A.A.M.R.T. estimate
. occupational shift	A.A.M.R.T. estimate of a 10 year working life. It is becoming more difficult for a technician to return to the occupation, due to technological changes.
. training output	Registrar at N.A.I.T. Since it will take 2 years for graduates to impact the manpower stock, our recommendations have been based upon the graduating years 1984 to 2000.
. attrition	A.A.M.R.T. records.

o Estimating Requirements

. Historical Ratio

The current ratio of x-ray technicians to population of 1:2,630 was used to project the number of technicians required in the future to maintain the current level of manpower. This method was the selected manpower scenario.

TABLE XVIII.2.4: MANPOWER REQUIREMENTS

PROVINCE: ALBERTA

OCCUPATION: X-RAY TECHNICIANS

PROJECTED MANPOWER REQUIREMENTS

YEAR	PROJECTED STOCK	POPULATION RATIO 1:2,629 MEDIUM POPULATION
1981	770	820
NET		50
1982	749	851
NET		102
1983	730	885
NET		155
1984	713	916
NET		203
1985	697	944
NET		247
1990	626	1,076
NET		450
1995	580	1,202
NET		622
2000	541	1,326
NET		785

. Utilization Method

The current number of services per technician of 1,404 was applied to the projected population of the province to determine future manpower demand. Since this current number of services did not include private clinics and hospitals, however, the results were considered incomplete.

o Net Manpower Requirements

The net manpower requirements under the most likely scenario are shown in Table XVIII.2.4, opposite. The most likely scenario is based on the population ratio method, under the medium population projection. On the basis of this analysis, there is an immediate requirement for x-ray technicians in Alberta.

Table XVIII.3.1

Province: SASKATCHEWAN
Occupation: X-RAY TECHNICIANS

Year	Number of Practitioners	Population to Manpower
1973	182	1: 4990
1974	185	1: 4900
1975	198	1: 4630
1976	204	1: 4520
1977	225	1: 4160
1978	242	1: 3915
1979	255	1: 3750
1980	283	1: 3410

Source:

SASKATCHEWAN SOCIETY OF X-RAY TECHNICIANS

TABLE XVIII.3.2

TOTAL NUMBER OF ACTIVE X-RAY TECHNICIANS

IN SASKATCHEWAN, BY AGE

AGE GROUP	TOTAL %
22 - 26	43 %
27 - 31	18 %
32 - 36	22 %
37 - 41	6 %
42 - 46	7 %
47 - 51	2 %
52 - 56	1 %
57 - 61	1 %

AU8Note: Age breakdown unavailable. Calculated using same proportion, and
AU8 one-third the numbers, as the age breakdown of members in the Province of Alberta.

SASKATCHEWAN

a) Legal Controls

The X-Ray Technicians Act (R.S.S. 1978, C.X-1) controls the right of individuals to practice in the province as registered x-ray technicians.

The registration requirements are shown in Appendix III - Scope of Practice.

b) Assumptions

o Manpower Stock

Table XVIII.3.1, opposite, shows the number of Saskatchewan x-ray technicians registered with the C.A.M.R.T. The Saskatchewan Society of X-Ray Technicians estimates that 100% of the active technicians in the province are registered with the national association. The 1980 figure excludes those technicians who are working in other occupations or who are nuclear medicine, ultra sound or combined x-ray/medical laboratory technicians. For the purposes of this study, it has been assumed that the x-ray technicians are working full time. The age distribution of technicians is shown in Table XVIII.3.2, opposite.

o Factors Affecting Manpower Supply

The assumptions made with respect to each of the factors which potentially affect manpower stock are shown in Table XVIII.3.3, opposite. For each assumption, the information source has been identified. Comments on each factor are shown below:

Table XVIII.3.3

Factors Affecting Manpower Supply

Province: SASKATCHEWAN
Occupation: X-RAY TECHNICIANS

Factor	Assumption	Source
Opening Stock	283	S.S.R.T.[2]
Net Migration	-1% of opening stock	S.S.R.T.
Net Immigration	Zero for all years	S.S.R.T.
Net Occupational Shift[1]	-10% of stock	S.S.R.T.
Training Output	19 for all years	KELSEY[3]
Attrition	Actual Retirement	ESTIMATE[4]

Notes:

[1] Includes Active/Inactive Flows

[2] S.S.R.T. IS SASKATCHEWAN SOCIETY OF X-RAY TECHNICIANS

[3] KELSEY IS REGISTRAR KELSEY INSTITUTE

[4] ESTIMATE BASED ON AGE DISTRIBUTION FOR X-RAY TECHNICIANS IN ALBERTA

Factor	Level of Confidence
• migration	S.S. X-Ray T. estimate
• immigration	S.S. X-Ray T. estimate
• occupational shift	S.S. X-Ray T. estimate of a 10 year working life. Due to technological changes, it is becoming more difficult for a technician to return to the occupation.
• training output	Registrar, Kelsey Institute. Since it will take 2 years for graduates to impact the manpower stock, our recommendations have been based upon the graduating years 1984 to 2000.
• attrition	Based on the age distribution of x-ray technicians in the Province of Alberta, but with 1/3 the total Alberta numbers.

o Estimating Requirements

• Historical Ratio

The current ratio of x-ray technicians to population of 1:3,410 was used to project the number of technicians required in the future to maintain the current level of manpower. This method was the selected manpower scenario.

TABLE XVIII.3.4: MANPOWER REQUIREMENTS

PROVINCE: SASKATCHEWAN

OCCUPATION: X-RAY TECHNICIANS

PROJECTED MANPOWER REQUIREMENTS

YEAR	PROJECTED STOCK	POPULATION RATIO 1:3,409 MEDIUM POPULATION
1981	271	287
NET		16
1982	260	291
NET		31
1983	250	295
NET		45
1984	242	299
NET		75
1985	235	304
NET		69
1990	206	325
NET		118
1995	190	343
NET		153
2000	177	360
NET		183

- Utilization Method

  The current number of services per technician of 2,425 was applied to the projected population of the province to determine future manpower demand. However, as this current number of services did not include private clinics and hospitals, the results were considered incomplete.

o Net Manpower Requirements

The net manpower requirements under the most likely scenario are shown in Table XVIII.3.4, opposite. The most likely scenario is based on the population ratio method, under the medium population projection. On the basis of this analysis, there is a small requirement for x-ray technicians throughout the forecast period.

Table XVIII.4.1

Province: MANITOBA
Occupation: X-RAY TECHNICIANS

Year	Number of Practitioners	Population to Manpower
1975	306	1: 3300
1976	309	1: 3300
1977	-	-
1978	390	1: 2650
1979	406	1: 2560
1980	421	1: 2500

Source:

MANITOBA SOCIETY OF RADIOLOGICAL TECHNOLOGISTS INC.

Table XVIII.4.2

Factors Affecting Manpower Supply

Province: MANITOBA
Occupation: X-RAY TECHNICIANS

Factor	Assumption	Source
Opening Stock	421	M.S.R.T.I.[2]
Net Migration	-20 for all years	M.S.R.T.I.
Net Immigration	3 for all years	M.S.R.T.I.
Net Occupational Shift[1]	-10% of stock	M.S.R.T.I.
Training Output	27 for all years	Red River[3]
Attrition	-8 for all years	M.S.R.T.I.

Notes:

[1] Includes Active/Inactive Flows

[2] M.S.R.T.I. is Manitoba Society of Radiological Technologists Inc.

[3] Red River is Registrar of Red River Community College

MANITOBA

a) Legal Controls

There is no legislation controlling the right of x-ray technicians to practice in Manitoba.

b) Assumptions

o Manpower Stock

Table XVIII.4.1, opposite, shows the number of Manitoba x-ray technicians registered with the C.A.M.R.T. The Manitoba Society of Radiological Technologists Incorporated estimates that 100% of the active technicians in the province are registered with the national association. The 1980 figure excludes those technicians who are working in other occupations or who are nuclear medicine, ultra sound or combined x-ray/medical laboratory technicians. For the purposes of this study, it has been assumed that the x-ray technicians are working full time. There is no available age breakdown of Manitoba x-ray technicians.

o Factors Affecting Manpower Supply

Table XVIII.4.2, opposite, shows the assumptions made with respect to each of the factors which potentially affect the manpower stock. For each assumption, the source of information has been identified. Comments on each factor are shown below:

Factor	Level of Confidence
• migration	M.S.R.T.I. estimate
• immigration	M.S.R.T.I. estimate
• occupational shift	M.S.R.T.I. estimate of a 10 year working life. Due to technological changes, it is becoming more difficult for a technician to return to the occupation.
• training output	Registrar, Red River Community College. Since it will take 2 years for graduates to impact the manpower stock, our recommendations have been based upon the graduating years 1984 to 2000.
• attrition	Based on the M.S.R.T.I. estimate that 40% of members are over age 35.

o Estimating Requirements

• Historical Ratio

The current ratio of x-ray technicians to population of 1:2,500 was used to project the number of technicians required in the future to maintain the current level of manpower. This method was the selected manpower scenario.

TABLE XVIII.4.3: MANPOWER REQUIREMENTS

PROVINCE: MANITOBA

OCCUPATION: X-RAY TECHNICIANS

PROJECTED MANPOWER REQUIREMENTS

YEAR	PROJECTED STOCK	POPULATION RATIO 1:2,504 MEDIUM POPULATION
1981	381	424
NET		43
1982	345	426
NET		81
1983	313	429
NET		116
1984	284	432
NET		148
1985	258	435
NET		177
1990	161	449
NET		288
1995	104	461
NET		357
2000	70	471
NET		401

- Utilization Method

  The current number of services per technician of 1,585 was applied to the projected population of the province to determine future manpower demand. However, as this current number of services did not include private clinics and hospitals, the results were considered incomplete.

o Net Manpower Requirements

The net manpower requirements under the most likely scenario are shown in Table XVIII.4.3, opposite. The most likely scenario is based on the population ratio method, under the medium population projection. On the basis of this analysis, there is an immediate requirement for x-ray technicians.

APPENDIX III - SCOPE OF PRACTICE

X-RAY TECHNICIANS - SCOPE OF PRACTICE

PROVINCE	CERTIFICATION/LICENSING/REGISTRATION		
	REQUIRED CHARACTERISTICS OF APPLICANTS	CERTIFICATION REQUIREMENTS	LICENSING REQUIREMENTS
Saskatchewan The X-Ray Technicians Act R.S.S. 1978 Chap X-1	Good moral character.	Must have passed provincial senior matriculation exams or equivalent and qualifying as an X-ray technician, or is a member of The Canadian Society of Radiological Technicians.	

APPENDIX IV - BIBLIOGRAPHY

X-RAY TECHNOLOGISTS

BIBLIOGRAPHY

Alberta Career Resources Branch, Advanced Education and Manpower. Occupational Profiles - Medical X-Ray Technologist. Edmonton: October 1979.

Alberta Social Services and Community Health, Alberta Health & Social Services Disciplines Committee, Research and Planning Division. Health and Social Services Manpower in Alberta, 1979. Edmonton.

----------. September 30, 1980 Survey of Major Employers of Health and Social Service Personnel in Alberta. Edmonton: February 1981.

Brogdon, Byron G., M.D., and Robert D. Mosely, Jr., M.D. "The Coming Crisis in Radiological Manpower -- Shortage?" Radiology, 114 (February 1975), pp. 489-491.

Canadian Association of Medical Radiation Technologists. Annual Reports, 1973 to 1980.

Canadian Association of Radiologists and Canadian Association of Medical Radiation Technologists Working Group for the Federal-Provincial Steering Committee on Workload Measurement Systems. Canadian Schedule of Unit Values for Diagnostic Radiology Procedures, First Edition 1982-1983. Fall 1981.

Committee on Technology Job Descriptions and Manpower Studies, a conjoint committee of the American College of Radiology and the American Society of Radiologic Technologists, Thomas T. Thompson, M.D., and Helmut A. Mueller, M.D. "Special Report -- Manpower Requirements for Radiologic Technologists". Radiology, 135 (May 1980), pp. 525-527.

Deeley, T.J., J. Baker, and J. Brindle. "Report -- Recruitment in Radiotherapy." Medical Education, 10 (1976), pp. 313-314.

Kiernan, Brian, M.S., and H.D. Rosenbaum, M.D. "The Impact of a Physician Assistant in Diagnostic Radiology [PA-DR] on the Delivery of Diagnostic Radiologic Clinical Services." Investigative Radiology, 12 (January/February 1977), pp. 7-14.

MacEwan, D.W. "Radiology Services on a Tight Budget". The Journal of the Canadian Association of Radiologists, Vol. 31 (June 1980), pp. 129-134.

MacEwan, D.W., J. Lock and R.J. Walton. "Radiology Services for One Million People." The Journal of the Canadian Association of Radiologists, Vol. 28, No. 1 (March 1977), pp. 3-11.

MacEwan, D.W., N. Roos, and T.J. Giles. "Education and Practice Locations of Canadian Diagnostic Radiologists." The Journal of the Canadian Association of Radiologists, Vol. 29 (December 1978), pp. 225-228.

Manitoba, Province of, Department of Education, Program Development and Evaluation. 1980 Manitoba Community Colleges Follow-Up Survey. Winnipeg: 1981.

Manitoba, Province of, Departments of Health and Community Services, Research Section, Barbara Miller. Health Manpower Provincial Report, Manitoba 1979. Winnipeg: 1979.

"Manpower Goals in Radiation Oncology." Cancer, 37 (Supplement - April 1976), pp. 2140-2148.

Marschke, Charles H., B.A., R.T. "Radiation Therapy Technology Manpower Survey." Radiologic Technology, Vol. 48, No. 3 (November/December 1976), pp. 287-289.

Ontario, Province of, Department of Health. Manpower Provincial Report. Toronto.

Rominger, C. Jules, M.D., and Diana Browning, T.T. "Radiation Therapy Technology Manpower Needs, Problems, Potential - 1976." International Journal of Radiation Oncology, Biology, Physics, 2 (March/April 1977), pp. 337-343.

Saskatchewan, Province of. X-Ray Technicians Act, The, R.S.S. 1978, Chap. X-1.

Saskatchewan, Province of, Department of Health, Policy Research and Management Services Branch. Saskatchewan Health Manpower Annual Report - 1978. Regina.

Statistics Canada, Health Division, Health Manpower Statistics Section. Health Manpower - Radiological Technicians - 1976. Ottawa: Ministry of Industry, Trade and Commerce, January 1978.

Statistics Canada. "Radiological Technicians", extracted from Publication 83-231, "Compendium of Selected Health Manpower Statistics", March 1979. Canadian Journal of Radiography, Radiotherapy, Nuclear Medicine., 10 (July 1979), pp. 163-167.

Story, Polly C. Statement before Senate Labor and Public Welfare Committee - "Special Report on Senate Bill 667 (The Radiation Health and Safety Act of 1973)." Radiologic Technology, 46 (November/December 1974), pp. 152-184.

Thomson, J.L.G. "Shortage of Radiologists." British Medical Journal, 2 (November 1977), P. 1225.

University of British Columbia, Division of Health Services Research and Development, Health Sciences Centre. Rollcall 79. Vancouver: 1980.

University of British Columbia, Health Services Centre, Division of Health Services Research and Development. Diagnostic Ultrasound in British Columbia, 1979-1980 - Provision and Utilization. Vancouver: September 1980.

Province of
British Columbia

Province of
Alberta

Province of
Saskatchewan

Province of
Manitoba

WESTERN CANADA
HEALTH MANPOWER TRAINING STUDY

Category # 3 Report XIX

RESPIRATORY TECHNOLOGISTS

Report XIX - RESPIRATORY TECHNOLOGISTS

REPORT XIX

RESPIRATORY TECHNOLOGISTS

THE REQUIREMENT FOR ALTERNATIVE TRAINING

AND FUNDING ARRANGEMENTS IN WESTERN CANADA

TABLE OF CONTENTS

PAGE

I. INTRODUCTION

Study Background.....
Study Objectives.....
Study Approach.....
Occupation Definition.....

II. TRAINING NEEDS IN WESTERN CANADA

Manpower Requirements.....
Existing Training Program.....
Occupational Issues.....

III. TRAINING RESPONSES

Decision Process.....
Timing and Location of Manpower Requirements.....
Indicated Manpower Responses.....

IV. RECOMMENDATIONS.....

APPENDIX I - Study Approach and Methodology
APPENDIX II - Provincial Net Manpower Requirement

I. INTRODUCTION

STUDY BACKGROUND

The provision of effective health services to the community is, to a considerable degree, dependent on three essential resources:

- an adequate supply of well-trained specialist staff in each health occupation group
- the development of adequate facilities to service the community
- the availability of adequate funds to ensure cost-effective and efficient health services.

The range and complexity of health treatment programs has expanded greatly in Canada during the last twenty-five years. In addition, changing technology and the development of new treatment programs have resulted in an increased requirement for skilled, adequately trained health manpower. These factors have resulted in an increased emphasis on manpower planning and skill training for health occupations to ensure an adequate supply of trained practitioners to meet defined manpower requirements.

STUDY OBJECTIVES

The Western Canada Health Manpower Training Study was initiated by the western Premiers at their annual conference in 1980. The study terms of reference contain two major objectives. These are:

- to assess the existing and future needs for health manpower training programs and facilities in western Canada

- to make recommendations for the rationalization of the location and funding of health manpower training programs and facilities in western Canada.

STUDY APPROACH

The study was under the direction of a Steering Committee consisting of health and education representatives from the Provinces of British Columbia, Alberta, Saskatchewan and Manitoba. The study took place over two years and consisted of a review of 26 health occupations grouped into five categories. Each occupation has been studied separately, and a report has been produced for each. In addition, a report examining the inter-relations of the occupations has been submitted to the Steering Committee.

Data was collected from provincial and national associations and from government agencies for each of the occupations on the numbers of individuals registered with the associations and their current status as active or inactive practitioners. An attempt was also made to gather data on historical trends, the number of graduates from training, trends in movement of active practitioners to inactive status, occupational shifts out of the profession, trends in migration to and from other provinces, and immigration and emigration.

In the cases where validated and reliable information was not available, association spokesmen, employers and individuals in each of the occupations were interviewed to provide qualitative opinions regarding present and future trends affecting the manpower supply and requirement.

A literature review was conducted to examine the problems facing the occupation. A bibliography of the material reviewed is contained in Appendix IV.

A health manpower computer model was developed to assist in the preparation of projections on the future supply and requirement for each occupation. A critical analysis of these twenty-year projections was then undertaken to develop the various supply and requirement scenarios presented in this report.

Separate documents describing the manpower planning methodology and the training decision-making process were issued. A brief summary of the overall study approach and methodology is set out in Appendix I and details of the provincial net requirements are set out in Appendix II.

OCCUPATION DEFINITION

This report addresses the need for training programs for respiratory technologists in each of the four provinces. For the purposes of this study, a Respiratory Technologist is defined as an individual who:

"administers respiratory therapy to patients in hospital or at home. Discusses patient's treatment with medical and nursing staff. Sets up ventilators, incubators, manual resuscitators and other life support equipment. Attaches life support equipment to patient. Operates controls of equipment to adjust airway pressure, humidity, blood gas levels, respiratory rate and other factors. Monitors patient's progress and equipment function. Performs basic pulmonary function tests to assist physician in diagnosis of respiratory illnesses. Takes blood sample from patient and analyzes blood gas values, if required. Explains treatment procedures and demonstrate equipment operation to patients and hospitals personnel. Performs artificial respiration and external cardiac massage, if required. Services and repairs equipment and inspect all medical piping, manifolds and patient alarm systems."[1]

In a pamphlet entitled, The Role of the Respiratory Technologists, April 1976, the Canadian Society of Respiratory Technologists, define Respiratory Technologists as:

"an allied health discipline devoted to the scientific applications of technology in order to assist the physician in the diagnosis, treatment and promotion of the well being of patients with respiratory and associated disorders."

---

1. Canadian Classification and Dictionary of Occupations - No. 3159, 1980 Revision.

The utilization of the skills of the Respiratory Technologists varies from province to province, and between institutions. These skills have been broadly categorized under the general heading of therapeutic services, (including cardio-pulmonary resuscitation and support, mechanical ventilatory support and therapeutic gas administration), and technical services, (including cleaning and sterialization of respiratory care equipment, repair and maintenance of respiratory equipment). In addition the Canadian Society of Respiratory Technologists has identified two additional areas to utilize the range of skills of the qualified Respiratory Technologist. These are diagnostic services, (including arterial blood gas analysis, and cardio-pulmonary testing and monitoring) and education (including patient and family instruction, student instruction, education of medical students and physicians, and other hospital staff).

In summary Respiratory Technologists are considered to have specialist technical knowledge for the increasingly sophisticated treatment modalities for respiratory care.

Exhibit 1: Manpower Requirements

Western Canada: RESPIRATORY TECHS

(Based on Most Likely Scenario From Each Province)

Year	Projected Stock		Projected Requirement
1981	484		634
		Net	150
1982	521		649
		Net	128
1983	556		665
		Net	109
1984	587		681
		Net	94
1985	616		696
		Net	80
1990	724		766
		Net	42
1995	787		831
		Net	44
2000	825		891
		Net	66

II - TRAINING NEEDS IN WESTERN CANADA

This section presents the statistical data for manpower requirements for western Canada, reviews the basis for projection and confidence in basic data, existing training programs for respiratory technologists, and reviews major issues influencing the occupation.

MANPOWER REQUIREMENTS

Exhibit 1, opposite, shows the projected stock and requirements for respiratory technologists during the period 1981-2000. The projections are based on the most likely scenario derived for each province, and show a minimal requirement for additional practitioners on a regional basis.

METHODOLOGY

The most likely scenario has been based on the current population ratio for the provinces of Alberta and Manitoba, and on a service target ratio of 1:13,000 population for the provinces of British Columbia and Saskatchewan.

These different approaches to projecting manpower requirements reflect the differing patterns of utilization of respiratory technologists in each of the provinces. Alberta and Manitoba have developed a pattern of utilization for respiratory technologists which appears to reflect the expanded role outlined above. In Alberta, there is currently a ratio of 1:8,676, and in Manitoba there is a ratio of 1:10,138. For these provinces it is assumed that this pattern of utilization will continue in the future.

In contrast, the current ratio of practitioner to population in British Columbia is 1:32,000, and in Saskatchewan 1:35,800. It is not clear

however, whether this pattern of usage has resulted from either a limited supply of manpower, or an undeveloped role for the occupation in the health care delivery system. It is apparent that potential positions that could be occupied by specialist respiratory technologists are currently held by other categories of manpower, (Nurses, Occupational Therapists, etc.)

The priority for the training and recruitment of respiratory technologists varies between institutions and funding agencies. As an alternative to the projection of manpower requirements for British Columbia and Saskatchewan on the basis of the service target ratio of 1:13,000, manpower requirements were projected based on the current ratio of practitioners to population. This presupposes that the current pattern of manpower utilization will continue in the future. Under this alternative assumption there is the potential for a minimal surplus.

The most likely scenario was selected based on the assumption that Alberta and Manitoba continue the existing pattern of utilization of respiratory technologists, and that British Columbia and Saskatchewan increase the number of budgeted positions for respiratory technologists. Training recommendations have been prepared to reflect this scenario. In addition, however, the training implications of the continuation of the current pattern of utilization in British Columbia and Saskatchewan have been assessed and alternative training options prepared.

The approaches used to determine manpower requirements are discussed in Appendix I, below.

Degree of Confidence in Data

Projections of manpower supply have been prepared based on current manpower stock, net migration, net immigration, occupational shift including active/inactive movements, training outputs and attrition. With the exception of Manitoba there is no mandatory requirement for the registration of

TABLE 1

TRAINING PROGRAMS - WESTERN CANADA

RESPIRATORY TECHNOLOGISTS

	PROGRAMS	ANNUAL OUTPUT
British Columbia	1	10
Alberta	2	54
Manitoba	1	16

respiratory technologists under provincial legislation. Historically, all data on registered respiratory technologists has been maintained by the national association, which administers the national registration examinations. In the last three years, provincial associations have assumed responsibility for record keeping on membership. It is considered that the information obtained on manpower stock, training outputs and age distribution of current practitioners is acceptable. Information on manpower movements, (migration, immigration and occupational shift), is based on estimates obtained from both the national and provincial associations. This information varies in quality and accuracy.

The manpower supply information for this occupation has been based on a number of assumptions and estimates gathered from associations, and the manpower projections derived from this information are as accurate as can be achieved, given the absence and softness of basic manpower data.

EXISTING TRAINING PROGRAMS

The existing training programs for respiratory technologists are shown in Table 1, opposite.

A more detailed discussion of these training programs is contained in Report 3-A, "The Scope of Existing Training Programs - Category III Occupations".

OCCUPATIONAL ISSUES

The supply and requirements for respiratory technologists in western Canada are influenced by a number of general trends and issues. These are:

Historical and Current Trends

- Use of Specialist Respiratory Cure Units

  Specialist Respiratory Care Units have been established to meet the needs resulting from increasingly sophisticated theraupeutic care modalities for pulmonary and cardiac disorders.

- Expanded Role

  The role of the Respiratory Technologist has expanded as the application of new technology has increased in the diagnosis, treatment management and care of patients with respiratory and associated disorders.

- Limits on Specialization

  To a great degree, however, the need for specialist respiratory services are dependent on the defined role and size of the hospital/institution, specialist services and special care units developed in the hospital and on the level of the illness of patients.

- Lack of Consistent Role

  To date the scope of activity and the role of the respiratory technologist has not been comprehensively defined or developed uniformly across Canada. This accounts for the different emphasis and level of utilization of specialist manpower between provinces and regions of the country. In addition this has resulted in an overlap of basic functions with nursing practitioners and physiotherapists who are also involved in respiratory care.

o Composition of the Workforce

It is estimated that the current workforce is equally distributed between male and female practitioners. Data is not available on the current distribution of training programs by male and female, and consequently no attempt has been made to estimate the future composition of the workforce.

o Pattern of Employment

Based on survey data from the provinces of Alberta and Saskatchewan, it is estimated that approximately 80% of respiratory technologists work.

There is no information on the number of hours worked by part-time employees, and consequently no attempt has been made to calculate full-time equivalent practitioners.

Situations Likely to Occur with Major Policy Changes

o Potential Future Role

Given the trend towards an aging population, practitioners in the field of respiratory care believe that there is a need for increased specialist services and manpower in respiratory care. It is apparent, however, that this move toward specialist respiratory personnel has been limited by a lack of clear role definition and policies for respiratory care.

If the trend towards specialists in respiratory technology is based a clear strategy to provide specialist respiratory care in the hospital setting, the demand for qualified respiratory technologists would increase.

Exhibit 2

Net Manpower Requirements by Province and Region

Most Likely Scenario

Occupation: RESPIRATORY TECHS

Year	British Columbia		Alberta		Saskatchewan		Manitoba		Region	
	Stock	Req	Stock	Req	Stock	Req	Stock	Req	Stock	Req
1981	78	206	276	248	26	75	104	105	484	634
Net		128		-28		49		1		150
1982	84	210	308	258	25	76	104	105	521	649
Net		126		-50		51		1		128
1983	90	214	337	268	25	77	104	106	556	665
Net		124		-69		52		2		109
1984	95	218	363	278	25	78	104	107	587	681
Net		123		-85		53		3		94
1985	100	223	387	286	25	80	104	107	616	696
Net		123		-101		55		3		80
1990	121	244	474	326	25	85	104	111	724	766
Net		123		-148		60		7		42
1995	133	263	525	364	25	90	104	114	787	831
Net		130		-161		65		10		44
2000	140	279	556	402	25	94	104	116	825	891
Net		139		-154		69		12		66

III - TRAINING RESPONSES

DECISION PROCESS

The decision process outlined in Appendix I and discussed in detail in Report C, "A Decision Process to Evaluate the Location of, and Funding Arrangements For Health Occupation Training Programs in Western Canada", was used to evaluate the training implications of the net manpower requirements for respiratory technologists discussed above. This section contains the results of this analysis.

TIMING AND LOCATION OF MANPOWER REQUIREMENTS

Exhibit II, opposite, shows the projected manpower situation for respiratory technologists in each of the western provinces for the period 1981-2000, under the most likely scenario. As the exhibit indicates, there is a potential surplus in Alberta, and an indicated requirement in British Columbia, Saskatchewan and Manitoba.

Because of the inconsistent pattern of manpower utilization between provinces in western Canada alternative manpower requirements have been developed for each province. These are discussed below.

- British Columbia

  On the basis of a service target ratio of 1:13,000 there is a requirement for an additional 140 respiratory technologists by the year 2000. However based on the current population ratio of 1:32,000 there is the potential for a minimal surplus of 27 by the year 2000.

  In a survey of Employment Vacancies and Manpower Availability conducted by the Canadian Society of Respiratory Technologists in March 1981 a

requirement for an additional 86 respiratory technologists was identified for British Columbia. This was based on immediate staff opening and positions for which budget allocations had been requested. The implications of this survey are that the current low level of utilization of respiratory technologists in British Columbia may result from the unavailability of trained manpower in the province. The training program at Cariboo College has only recently been introduced, and it will not graduate the first output of students until July 1982. The service target ratio of 1:13,000 is used as a most likely scenario for British Columbia based on an assumption that employers will develop a broader role for qualified respiratory technologists in the future.

o Alberta

Based on the current population ratio of 1:8,676 there is a potential surplus of 154 practitioners by 2000. Based on a service target ratio of 1:13,000 there is a potential surplus of 288 by 2000.

The current population ratio has been used for the most likely scenario based on the assumption that the current role developed by the major employers will continue in the future.

In addition to the information obtained from the professional association on active registered stock, data from the 1981 vacancy survey in the province of Alberta has been used to determine the surplus or requirement for respiratory technologists in the province of Alberta. The survey indicates that there are 255 budgeted positions in the province. The association indicates that there are approximately 240 registered members in 1980. This indicates that there is a requirement for 13 additional practitioners.

- Saskatchewan

  On the basis of a service target ratio of 1:13,000 there is a requirement for 69 additional respiratory technicians in Saskatchewan by 2000. Based on the current population ratio there is a requirement for an additional 9 practitioners by 2000.

  The service target ratio of 1:13,000 is used as a most likely scenario for Saskatchewan on an assumption that employers will develop a broader role for qualified respiratory technologists in the future.

- Manitoba

  Based on the current population ratio of 1:10,138 there is a potential requirement for an additional 11 respiratory technologists by the year 2000. Based on a service target ratio of 1:13,000 there is a potential surplus of 13 by 2000.

  The current population ratio has been used for the most likely scenario based on the assumption that the current role developed by the major employers will continue in the future.

INDICATED MANPOWER RESPONSES

Additional training capacity is considered to be an appropriate response to achieve a balanced manpower situation for respiratory technologists in western Canada. At the regional level there is a need to train approximately 5 additional practitioners per year throughout the forecast period. The indication of the national vacancy survey conducted by the Canadian Society of Respiratory Technologists is that there is a relatively balanced supply of manpower in Ontario and the Maritimes. This perception

appears to be endorsed by the Government of Ontario annual manpower report, which indicates that all graduates available for work are currently employed.[1] It should be noted, however, that Ontario is approaching the service target ratio of 1:13,000 (1981 estimate at 1:14,482) and concern has been expressed that the labour market in that province may be capable of absorbing a limited number of new graduates in the future. At present, and in the immediate future, there is no potential surplus of trained manpower in other areas of Canada on which to draw.

The size of the inactive pool of practitioners is difficult to accurately project since association records are not complete. The provincial associations estimate, however, that there are approximately 50 inactive practitioners, although it is not known how many of these would be available to return to the active workforce. The composition of the active work force of respiratory technologists is significant in that there are approximately equal numbers of male and female practitioners in Western Canada. Table 2, opposite, shows the composition of the active respiratory technologists by province and region. Alberta has the highest proportion of female practitioners (57.2%) while Saskatchewan has the highest proportion of male practitioners.

These figures are also reflected in the proportion of parttime employees. The March 1981 vacancy survey, Alberta Health and Social Service Manpower Monitoring System shows that 19.8% of practitioners work part-time. This contrasts with the June 1981 survey from the Health Manpower Monitoring System in Saskatchewan which shows that 8.3% of practitioners work parttime.

---

[1] Health Manpower in Ontario 1980

Thus, given the relatively small number of inactive and part-time practitioners in western Canada, and the potential requirement for practitioners in the balance of Canada, it is reasonable to suggest that training will provide the most appropriate manpower response for the provision of qualified respiratory technologists in western Canada.

DEFINED ALTERNATIVE LOCATIONS

At the western Canada region level there is an adequate existing training base to meet the projected requirements for respiratory technicians. At the provincial level, however, there are disparities in supply. As indicated above there is a requirement for additional practitioners in British Columbia, Saskatchewan and Manitoba and a surplus in Alberta. There are currently training programs in British Columbia, Alberta and Saskatchewan. Prior to the establishment of the training program at Cariboo College, British Columbia relied exclusively on migration into the province, and on British Columbia residents being trained out of province.

Members of the profession believe that the absence of a training program in British Columbia tended to limit the number of professionally qualified practitioners available in the labour market. Traditionally the majority of graduates of the Alberta training programs have been able to find employment in the province, and therefore the rate of migration to British Columbia has been low.

Given this tendency for limited mobility in the profession, there are two training options to consider. The first option is to train all respiratory technologists in one location for western Canada. The second alternative is to continue with the existing structure of training to meet provincial requirements. Under the first alternative each province would pay a portion of ongoing operating costs, and training places would be allocated on the

number of graduates required by each province. Given the size of the provincial manpower requirements in Manitoba and British Columbia this alternative is not considered to be realistic. The most viable training alternative is to continue separate training programs in British Columbia, Alberta and Manitoba. Given the size of the manpower requirement in Saskatchewan it is appropriate for the Government of Saskatchewan to enter into a training contract with one of the other western provincial governments to secure training places in an existing program. With the potential surplus of training places in the Alberta programs it is appropriate for the required number of places to be reserved for Saskatchewan students in Alberta training programs.

Review of Funding Arrangements

The government of Saskatchewan should negotiate for 3 places in the Alberta training programs. Under the terms of a formalized training contract the government of Saskatchewan should share in the ongoing operational and administrative overhead costs of the program based on the proportion of training places contracted. It is anticipated that the approximate size of the training intake into programs for respiratory technology in Alberta will be 50 per year, of which Saskatchewan will hold 3 places. Therefore Saskatchewan should bear 6% of the ongoing operational and administrative overhead costs. Program development start up and capital costs should be excluded from the training agreements because the program is already in existence.

Defined Length of Training Agreement

The Government of Saskatchewan should establish a formal training agreement with the government of Alberta for an initial five year period, with subsequent renewal options for additional five year periods.

IV - RECOMMENDATIONS

Recommendations for each of the provinces are set out below.

- British Columbia

.1- that, on the basis of a service target ratio of 1:13,000, the training program at Cariboo College, be expanded to an annual intake of 25.

.2- that, alternatively, if the current population ratio is considered appropriate for British Columbia, the existing enrolment levels at Cariboo College should be maintained.

- Alberta

.3- that current enrolments for the province of Alberta in existing training programs in the province should be reduced by 25% (from 63 to 47 per year). NOTE: this figure of 47 excludes the 3 training places contracted for Saskatchewan.

- Saskatchewan

.4- that the government of Saskatchewan enter into a formal training agreement with the government of Alberta for three places in Alberta training programs.

.5- that the government of Saskatchewan share the ongoing operational and administrative overhead costs based on the proportion of training places allocated and under this bilateral training agreement Saskatchewan should pay 6% of program costs.

.6- that the formal training agreement between the governments of Saskatchewan and Alberta should be for a minimum period of five years, with an option for extension for further five year periods.

. Manitoba

.7- that Manitoba should maintain current enrolment levels.

APPENDIX I

STUDY APPROACH AND METHODOLOGY

STUDY APPROACH

Introduction

In order to achieve the study objectives, the work program consists of three key activities. These are:

- the analysis of manpower supply and requirements, and the calculation of net manpower requirements
- the analysis of existing training programs for Western Canada
- the development of recommendations for alternative training locations and funding arrangements

Analysis of Manpower Supply and Requirements

The analysis of manpower supply and requirements is designed to allow for a variety of data inputs, and for different emphasis depending on the occupation under review. A variety of data sources are used including provincial and national associations, health insurance agencies, and provincial health and education departments. In all instances, data is developed independently of previously published sources.

In addition to the basic projection of net manpower requirements, a number of sensitivity analyses have been completed to assess the impact of changed in the factors affecting supply and requirements, prior to developing recommendations for either additional training programs, or expanding existing training programs.

Approaches to Determining Manpower Requirements

The approach developed to determine manpower requirements uses three methods of projection. These are discussed below.

1. Service Utilization Approach

The utilization approach is based on an analysis of the pattern of health service usage. It establishes trends in service utilization and projects these onto future population estimates. There are three steps in the service utilization approach.

Step 1 - Determine Per Capita Utilization Rate

Historical data of the number of services provided, by age and sex of recipient is derived. The number of services per age/sex group is then divided by the population for group in the corresponding year. This results in a per capita utilization rate.

Step 2 - Project Future Service Required

The per capita utilization rate is projected onto the low, medium and high population for each year from 1981 to 2000. This results in an estimate of total future services.

Step 3 - Estimated Number of Practitioners Required

Having determined the total future services, the model projects the number of practitioners required, by assuming a constant level of services per practitioner. The number of services per practitioner is determined by dividing total services by the number of practitioners in the base year. To estimate the required number of practitioners, the model divides total future services required by the number of services per practitioner.

2. Service Target Ratio Approach

Service target ratios reflect a theorectical optimal manpower level required to meet health service requirements in the occupation under review. They are expressed as the ratio of practitioner to population. The service target ratios are derived based on discussion with health authorities, review of published reports, articles and summary of defined health care needs.

3. Population Ratio Approach

Population ratios are derived by dividing the total population at a specific point in time by the number of active practitioners. This results in a ratio of practitioners to population.

These ratios are analysed to determine if any trends exists. to project futuren manpower requirements, the model divides total projected population by the previously determined population ratio.

Summary of Approaches to Projecting Manpower Requirements

The three approaches outlined above have been used for the calculation of manpower requirements for this occupation. The specific application of each approach to this occupation is discussed under General Assumption, Appendix II, following.

Development of Recommendations for Alternative Training Locations and Funding Arrangements

We have developed a decision process to assist in developing recommendations for alternative training location(s) and funding arrangements. This process is designed to allow for the logical, consistent evaluation of a range of training alternatives.

There are seven steps in the decision process:

- Step 1. Analysis of manpower requirements
- Step 2. Identification of the appropriate type(s) of training
- Step 3. Definition of alternative training locations
- Step 4. Evaluation of alternative locations for new programs
- Step 5. Establishment of timing of training program requirement
- Step 6. Recommendation on training action(s) and location(s)
- Step 7. Recommendation on funding alternative(s)

LABOUR MARKET SUPPLY

Labour market supply is the relationship between the estimated number of practitioners registered with the provincial associations, the number of practitioners actually employed and the number of vacant positions. Vacancy survey data (normally collected by provincial governments) will identify the total number of budgeted positions, which is the total of the number currently employed plus vacancies.

Labour market supply is a useful tool to estimate, or determine the employment situation for each occupation. The current supply situation is expressed as total budgeted positions divided by the total number of registered practitioners. This percentage (%) of qualified practitioners who are currently employed will indicate the flexability of the existing labour market.

Typically the flexability of the labour market will reflect vacancy rates. The following table illustrates theoretical labour market situations:

"Tight" labour market - 90% - 95% of practitioners actively employed with a vacancy rate of 12% to 20%.

"Balanced" Labour Market - 80% - 90% of practitioners actively employed with a vacancy rate of 8% to 12%.

"Loose" Labour Market - 70% - 80% of practitioners actively employed with a vacancy rate of 0% to 8%.

APPENDIX II

PROVINCIAL NET MANPOWER REQUIREMENTS

Table XIX.0.1

...ber of Practitioners by Province in Western Canada

Occupation: RESPIRATORY TECHS

Year	British Columbia[1]	Alberta[2]	Saskatchewan[3]	Manitoba[4]
1977	73	189	16	84
1978	82	219	17	94
1979	88	226	24	96
1980	82	240	27	104

Notes:

Table XIX.0.2

Factors Affecting Manpower Supply in Western Canada

Occupation: RESPIRATORY TECHS

Factor	British Columbia	Alberta
Opening Stock	82	240
Net Migration	5 for all years	5 for all years
Net Immigration	Zero for all years	Zero for all years
Net Occupation Shift	-10% of stock	-10% of stock
Training Output	Zero for 1981 10 for 1982-2000	55 for all years
Attrition	1 for 1981-1984 Zero for 1985-2000	Zero for all years

	Saskatchewan	Manitoba
Opening Stock	27	104
Net Migration	2 for all years	-2% of opening stock
Net Immigration	Zero for all years	Zero for all years
Net Occupation Shift	-10% of stock	-10% of stock
Training Output	Zero for all years	12 for all years
Attrition	Zero for all years	Zero for all years

GENERAL ASSUMPTIONS

Manpower Stock

Table XIX.0.1 (opposite), illustrate the total number of active respiratory technologists identified in each of the provinces in Western Canada.

Factors Affecting Manpower Supply

The assumptions made with respect to each of the factors which have the potential to affect manpower stock are shown opposite in Table XIX.0.2. These factors include migration, immigration, training output, active/inactive movement and retirement through attrition. For each of these assumptions, the information source has been identified. Assumptions affecting manpower have been based on historical and current information along with projected trends.

Estimating Requirements

- Historical Ratio

  For each province, the current ratio of respiratory technologists to population was used to project the number of practitioners required in the future to maintain to current level of manpower.

- Utilization

  The utilization approach was not used to determine net manpower requirements for respiratory technologists. Utilization data for respiratory technologits is not age specific, therefore, it does not provide an accurate utilization pattern of services related to the the changing proportion of populatioin age groups.

- Service Target Ratio

  A service target ratio of 1 respiratory technologist to 13,000 was developed based on the recommended staffing complement defined in Health and Welfare Canada - Special Care Units in Hospitals. This defines that active respiratory technology service units should be developed in hospitals, or groups of hospitals having 200 acute care beds, and approximately 6000 in-patient admissions per year, with approximately 1000 patients per year requiring respiratory care. The recommended staffing level is one respiratory technologist for every 1500 in-patient admissions.

  This staffing level was found to equate to 1 respiratory technologist per 13,000 population.

- Sensitivity Analysis

  In the absence of a clear pattern of service utilization no sensitivity analysis was undertaken for this occupation.

Table XIX.1.1

Province: BRITISH COLUMBIA
Occupation: RESPIRATORY TECHS

Year	Number of Practitioners	Population to Manpower
1977	73	1: 34160
1978	82	1: 30850
1979	88	1: 29290
1980	82	1: 31990

Source:

Table XIX.1.2

Factors Affecting Manpower Supply

Province: BRITISH COLUMBIA
Occupation: RESPIRATORY TECHS

Factor	Assumption	Source
Opening Stock	82	C.S.R.T.[2]
Net Migration	5 for all years	B.C.S.R.T.[3]
Net Immigration	Zero for all years	B.C.S.R.T.
Net Occupational Shift[1]	-10% of stock	B.C.S.R.T.
Training Output	Zero for 1981 10 for 1982-2000	CARIBOO COLLEGE[4]
Attrition	1 for 1981-1984 Zero for 1985-2000	B.C.S.R.T.

Notes:

[1] Includes Active/Inactive Flows

[2] C.S.R.T. IS CANADIAN SOCIETY OF RESPIRATORY TECHNOLOGISTS

[3] B.C.S.R.T. IS BRITISH COLUMBIA SOCIETY OF RESPIRATORY TECHNOLOGISTS

[4] CARIBOO COLLEGE PROGRAM HEAD

PROVINCIAL ASSUMPTIONS

BRITISH COLUMBIA

a) Legal Controls

There is no legislation controlling the right of respiratory technologists to practice in the province of British Columbia.

b) Assumptions

Table XIX.1.1 (opposite), indicates the total number of respiratory technologists in British Columbia identified as active.

o Factors Affecting Manpower Supply

The assumptions made with respect to each of the factors which have the potential to affect manpower stock are shown opposite in Table XIX.1.2. These factors include migration, immigration, training output and retirement. For each of these assumptions, the information source has been identified.

o Confidence in Factors Affecting Manpower Stock

The assumptions made on manpower supply for respiratory technologists were developed on information received from the Canadian Society of Respiratory Technologists, and on estimates obtained from the British Columbia Society of Respiratory Technologists.

Because of the small number of respiratory technologists, the active stock is considered to be accurate. No records are kept on the movements from migration, immigration or from active to inactive,

TABLE XIX.1.3: MANPOWER REQUIREMENTS

PROVINCE: BRITISH COLUMBIA

OCCUPATION: RESPIRATORY TECHNOLOGY

PROJECTED MANPOWER REQUIREMENTS

YEAR	PROJECTED STOCK	SERVICE TARGET 1:13,000 MEDIUM* POPULATION
1981	78	206
NET		128
1982	84	210
NET		126
1983	90	214
NET		124
1984	95	218
NET		123
1985	100	223
NET		123
1990	121	244
NET		123
1995	133	263
NET		130
2000	140	279
NET		139

Note: The asterisked column (*) represents the most likely scenario for this occupation in British Columbia.

therefore assumptions were developed based on estimates. The active to inactive estimates are based on a movement of -10% of active stock. Specific age distributions are not available from either the provincial or national association, and retirements were based on estimates obtained from the provincial association.

o Estimating Requirements

. Historical Ratio

For each province, the current ratio of 1 respiratory technologist to 32,000 population was used to project the number of practitioners required in the future to maintain to current level of manpower.

. Service Target Ratio

A service target ratio of 1 respiratory technologist to 13,000 population was used to determine a reasonable requirement level of respiratory technologists to attain by the year 2000.

o Net Manpower Requirement

The net manpower requirements under each projection approach are shown in Table XIX.1.3 (opposite). The most likely scenario is based on a service target ratio of 1:13,000 under the medium population projection.

Table XIX.2.1

Province: ALBERTA
Occupation: RESPIRATORY TECHS

Year	Number of Practitioners	Population to Manpower
1977	189	1: 10030
1978	219	1: 8910
1979	226	1: 8930
1980	240	1: 8680

Source:

Table XIX.2.2

Factors Affecting Manpower Supply

Province: ALBERTA
Occupation: RESPIRATORY TECHS

Factor	Assumption	Source
Opening Stock	240	C.S.R.T.[2]
Net Migration	5 for all years	A.S.R.T.[3]
Net Immigration	Zero for all years	A.S.R.T.
Net Occupational Shift[1]	-10% of stock	A.S.R.T.
Training Output	55 for all years	A.S.R.T.
Attrition	Zero for all years	A.S.R.T.

Notes:

[1] Includes Active/Inactive Flows

[2] C.S.R.T. is Canadian Society of Respiratory Technologists

[3] A.S.R.T. is Alberta Society of Respiratory Technologists

PROVINCIAL ASSUMPTIONS

ALBERTA

a) Legal Controls

There is no specific legislation controlling the right of respiratory technologists to practice in the province of Alberta.

b) Assumptions

Table XIX.2.1 (opposite), indicates the total number of respiratory technologists in Alberta identified as active.

o Factors Affecting Manpower Supply

The assumptions made with respect to each of the factors which have the potential to affect manpower stock are shown opposite in Table XIX.2.2. These factors include migration, immigration, training output and retirement. For each assumption, the information source has been identified.

o Confindence in Factors Affecting Manpower Stock

The assumptions made on manpower supply for respiratory technologists were developed on information obtained from the Canadian Society of Respiratory Technologists, and on estimates obtained from the Alberta Society of Respiratory Technologists.

The active stock figure was developed from information from the national association and was reviewed against the Health and Social Service Manpower in Alberta Report (1981. No records are kept on the

TABLE XIX.2.3: MANPOWER REQUIREMENTS

PROVINCE: ALBERTA

OCCUPATION: RESPIRATORY TECHNOLOGISTS

PROJECTED MANPOWER REQUIREMENTS

YEAR	PROJECTED STOCK	SERVICE TARGET 1:8,676 MEDIUM* POPULATION
1981	276	248
NET		-28
1982	308	258
NET		-50
1983	337	268
NET		-69
1984	363	278
NET		-85
1985	387	286
NET		-101
1990	474	326
NET		-148
1995	525	364
NET		-161
2000	556	402
NET		-154

Note: The asterisked column (*) represents the most likely scenario for this occupation in Alberta.

movements from migration, immigration or from active to inactive, therefore assumptions were developed based on estimates. The active to inactive estimates were based on a movement of -10% of active stock. Specific age distributions are not available from either the provincial or national association, and retirements were based on estimates obtained from the provincial association.

o Estimating Requirements

. Historical Ratio

For each province, the current ratio of 1 respiratory technologist to 8676 population was used to project the number of practitioners required in the future to maintain to current level of manpower.

. Service Target Ratio

A service target ratio of 1 respiratory technologist to 13,000 population was used to determine a reasonable requirement level of respiratory technologists to attain by the year 2000.

o Net Manpower Requirement

The net manpower requirements under each projection approach are shown in Table XIX.2.3 (opposite). The most likely scenario is based on a service target ratio of 1:13,000 under the medium population projection.

Table XIX.3.1

Province: SASKATCHEWAN
Occupation: RESPIRATORY TECHS

Year	Number of Practitioners	Population to Manpower
1977	16	1: 58580
1978	17	1: 55740
1979	24	1: 39830
1980	27	1: 35740

Source:

Table XIX.3.2

Factors Affecting Manpower Supply

Province: SASKATCHEWAN
Occupation: RESPIRATORY TECHS

Factor	Assumption	Source
Opening Stock	27	C.S.R.T.[2]
Net Migration	2 for all years	C.S.R.T.
Net Immigration	Zero for all years	C.S.R.T.
Net Occupational Shift[1]	-10% of stock	C.S.R.T.
Training Output	Zero for all years	C.S.R.T.
Attrition	Zero for all years	C.S.R.T.

Notes:

[1] Includes Active/Inactive Flows

[2] C.S.R.T. is Canadian Society of Respiratory Technologists

PROVINCIAL ASSUMPTIONS

SASKATCHEWAN

a) Legal Controls

There is no legislation controlling the right of respiratory technologists to practice in the province of Saskatchewan.

b) Assumptions

Table XIX.3.1 (opposite), indicates the total number of respiratory technologists in Saskatchewan identified as active.

o Factors Affecting Manpower Supply

The assumptions made with respect to each of the factors which have the potential to affect manpower stock are shown opposite in Table XIX.3.2. These factors include migration, immigration, training output and retirement. For each of these assumptions, the information source has been identified.

o Confindence in Factors Affecting Manpower Stock

The assumptions made on manpower supply for respiratory technologists were developed on information obtained from the Canadian Society of Respiratory Technologists.

The active stock figure was developed from information from the national association and was reviewed against the June 1981 Health Manpower monitoring System Report. No records are kept on the movements from migration, immigration or from active to inactive,

TABLE XIX.3.3: MANPOWER REQUIREMENTS

PROVINCE: SASKATCHEWAN

OCCUPATION: RESPIRATORY TECHNOLOGISTS

PROJECTED MANPOWER REQUIREMENTS

YEAR	PROJECTED STOCK	SERVICE TARGET 1:13,000 MEDIUM* POPULATION
1981	26	75
NET		49
1982	25	76
NET		51
1983	25	77
NET		52
1984	25	78
NET		53
1985	25	80
NET		55
1990	25	85
NET		60
1995	25	90
NET		65
2000	25	94
NET		69

Note: The asterisked column (*) represents the most likely scenario for this occupation in Saskatchewan.

therefore assumptions were developed based on estimates. The active to inactive estimates were based on a movement of -10% of active stock. Specific age distributions are not available from either the provincial or national association, and retirements were based on estimates obtained from the provincial association.

o Estimating Requirements

. Historical Ratio

For each province, the current ratio of 1 respiratory technologist to 1,3000 population, was used to project the number of respiratory technologists required in the future to maintain to current level of manpower.

. Service Target Ratio

The service target ratio of 1 respiratory technologist to 13,000 populatioin, was used to determine a reasonable requirement level of respiratory technologists to attain by the year 2000.

o Net Manpower Requirement

The net manpower requirements under each projection approach are shown in Table XIX.3.3 (opposite). The most likely scenario is based on the current population ration of1:13,000 under the medium population projection.

Table XIX.4.1

Province: MANITOBA
Occupation: RESPIRATORY TECHS

Year	Number of Practitioners	Population to Manpower
1977	84	1: 12250
1978	94	1: 10990
1979	96	1: 10900
1980	104	1: 10140

Source:

Table XIX.4.2

Factors Affecting Manpower Supply

Province: MANITOBA
Occupation: RESPIRATORY TECHS

Factor	Assumption	Source
Opening Stock	104	M.A.R.T.[2]
Net Migration	-2% of opening stock	M.A.R.T.
Net Immigration	Zero for all years	M.A.R.T.
Net Occupational Shift[1]	-10% of stock	M.A.R.T.
Training Output	12 for all years	M.A.R.T.
Attrition	Zero for all years	M.A.R.T.

Notes:

[1] Includes Active/Inactive Flows

[2] M.A.R.T. IS MANITOBA ASSOCIATION OF RESPIRATORY TECHNOLOGISTS

PROVINCIAL ASSUMPTIONS

MANITOBA

a) Legal Controls

The Registered Respiratory Technologists Act Chapter 17, Bill 25, S.M. 1980-1981, C17-Cap R115 is the act regulating the practice of respiratory technologists in the Province of Manitoba. In the act, respiratory technology is defined as "the medically supervised and co-ordinated scientific application of techniques and procedures to assist a physician in the safe and effective diagnosis, treatment and promotion of the well being of patients with respiratory and associated disorders.

b) Assumptions

Table XIX.4.1 (opposite), indicates the total number of respiratory technologists in Manitoba identified as active.

o Factors Affecting Manpower Supply

The assumptions made with respect to each of the factors which have the potential to affect manpower stock are shown opposite in Table XIX.4.2. These factors include migration, immigration, training output and retirement. For each of these assumptions, the information source has been identified.

TABLE XIX.4.3: MANPOWER REQUIREMENTS

PROVINCE: MANITOBA

OCCUPATION: RESPIRATORY TECHNOLOGISTS

PROJECTED MANPOWER REQUIREMENTS

YEAR	PROJECTED STOCK	SERVICE TARGET 1:10,139 MEDIUM* POPULATION
1981	104	105
NET		1
1982	104	105
NET		1
1983	104	106
NET		2
1984	104	107
NET		3
1985	104	107
NET		3
1990	104	111
NET		7
1995	104	114
NET		10
2000	104	116
NET		12

Note: The asterisked column (*) represents the most likely scenario for this occupation in Manitoba.

o Confidence in Factors Affecting Manpower Stock

The assumptions made on manpower supply for respiratory technologists were developed on information obtained from the Canadian Society of Respiratory Technologists and from the Manitoba Association for Respiratory Technology Inc.

The active stock figure was developed from information obtained from the national and provincial associations and was reviewed against Health Manpower Provincial Report - Manitoba. No records are kept on the movements from migration, immigration or from active to inactive, therefore assumptions were developed based on estimates. The active to inactive estimates were based on a movement of -10% of active stock. Specific age distributions are not available from either the provincial or national association, and retirements were based on estimates obtained from the provincial association.

o Estimating Requirements

- Historical Ratio

For each province, the current ratio of 1 respiratory technologist to 10,140 population, was used to project the number of practitioners required in the future to maintain to current level of manpower.

- Service Target Ratio

The service target ratio of 1 respiratory technologist to 13,000 population was used to determine a reasonable requirement level of respiratory technologists to attain by the year 2000.

Number/
Numéro

5

Province of British Columbia

Province of Alberta

Province of Saskatchewan

Province of Manitoba

WESTERN CANADA
HEALTH MANPOWER TRAINING STUDY

SECTION III - CATEGORY 4 REPORTS

- REGISTERED NURSES
- PSYCHIATRIC NURSES
- NURSING ASSISTANTS

Report A - THE SCOPE OF EXISTING TRAINING PROGRAMS - CATEGORY 4 OCCUPATIONS
Report XX - REGISTERED NURSES

Province of
British Columbia

Province of
Alberta

Province of
Saskatchewan

Province of
Manitoba

WESTERN CANADA
HEALTH MANPOWER TRAINING STUDY

Category # 4 - Report A

THE SCOPE OF EXISTING TRAINING PROGRAMS
Category # 4 OCCUPATIONS

THE SCOPE OF EXISTING TRAINING PROGRAMS

CATEGORY #4 OCCUPATIONS

PEAT, MARWICK and PARTNERS

MARCH, 1982

THE SCOPE OF EXISTING TRAINING PROGRAMS

CATEGORY #4 OCCUPATIONS

TABLE OF CONTENTS

	PAGE
INTRODUCTION	1.
SECTION 2 - TRAINING PROGRAMS FOR NURSING ASSISTANTS	2.1
SECTION 3 - TRAINING PROGRAMS FOR PSYCHIATRIC NURSING	3.1
SECTION 4 - TRAINING PROGRAMS FOR REGISTERED NURSES	4.1

THE SCOPE OF EXISTING TRAINING PROGRAM
CATEGORY #4 OCCUPATIONS

INTRODUCTION

In this paper we review the scope of existing training programs in Western Canada for Category 4 Occupations. The paper is divided into the following sections:

- Section 2 - Nursing Assistants
- Section 3 - Psychiatric Nursing
- Section 4 - Registered Nursing

In each section, we discuss existing training programs by province.

EXHIBIT 1
TRAINING PROGRAM FOR NURSING ASSISTANTS IN WESTERN CANADA
PROJECTED NUMBER OF AVERAGE ENROLMENTS AND GRADUATES

Province and Institution	Projected Number of Average Enrolments and Graduates										Source
	Enrolments					Graduates					
	1981	1982	1983	1984	1985	1981	1982	1983	1984	1985	
British Columbia											
Camosun	72	72	72	72	72	50	50	50	50	50	1
New Caledonia	10	10	10	10	10	7	7	7	7	7	2
Malaspina	108	108	108	108	108	80	80	80	80	80	1
Okanagan	36	36	36	36	36	32	32	32	32	32	3
Selkirk	30	30	30	30	30	30	30	30	30	30	4
V.C.C.	162	162	162	162	162	123	123	123	123	123	1
Douglas	80	80	80	80	80	60	60	60	60	60	5
	498	498	498	498	498	382	382	382	382	382	
Alberta											
Alta. Vocational College, Calgary	180	180	180	180	180	150	150	150	150	150	6
Alta. Vocational College, Edmonton	160	160	160	160	160	130	130	130	130	130	7
	340	340	340	340	340	280	280	280	280	280	
Saskatchewan											
Kelsey Institute	130	130	130	130	130	100	100	100	100	100	8
Wascana Institute	75	75	75	75	75	50	50	50	50	50	8
	205	205	205	205	205	150	150	150	150	150	
Manitoba											
St. Boniface Hospital	100	100	100	100	100	87	87	87	87	87	12
Assiniboine Community College	50	50	50	50	50	40	40	40	40	40	9
Keewatin Community College	33	40	40	40	40	41	37	36	37	36	10
Red River Community College	175	185	185	185	185	110	120	120	120	120	11
	363	375	375	375	375	218	214	213	214	213	

Source:

1. Production 79 - Page 202
2. Registrar - College of New Caledonia
3. Registrar - Okanagan College
4. Registrar - Selkirk College
5. Production 79 - Page 201
6. Registrar - Alberta Vocational College
7. Alberta Health and Social Service Training Program Inventory
8. Health Science Education Statistics, Sask. Continuing Education
9. Department Head, Assiniboine College
10. Registrar Kewatin College
11. Assistant Director, St. Boniface
12. Director, St. Boniface Hospital

SECTION 2
TRAINING PROGRAM FOR NURSING ASSISTANTS

Note: Nursing Assistants is a generic title for:

- Licensed Practical Nurses - British Columbia
- Certified Nursing Assistant - Alberta
- Certified Nursing Assistant - Saskatchewan
- Licensed Practical Nurses - Manitoba

2.0 WESTERN CANADA

There are fifteen training programs for Nursing Assistants in Western Canada, with the potential to graduate approximately 1,000 nursing assistants per annum. (Note Exhibit 1)

2.1 BRITISH COLUMBIA

Douglas College

Douglas College offers a basic twelve month nursing certificate program which prepares graduates for the licensing requirements of the British Columbia Council of Practical Nurses.

Graduates of the basic program can alternatively transfer into the second year of the Registered Nurse Diploma program offered at Douglas College.

The following colleges offer a twelve month course designed to prepare graduates for the licensing requirements of the British Columbia Council of Practical Nurses:

- Camosun College
- College of New Caledonia
- Malaspina College
- Okanagan College
- Selkirk College
- Vancouver Community College

2.2 ALBERTA

Training for the Nursing Assistant Certificate is provided at the Alberta Vocational Centre, Calgary and at the Alberta Vocational Centre, Edmonton. The program length is 12 months, and a number of intakes may be programmed simultaneously at each institution.

2.3 SASKATCHEWAN

One year training programs for Certified Nursing Assistants are offered at Kelsey Institute and at Wascana Institute. The program at Kelsey has two program intakes (September and February) each year, while Wascana has one (August).

2.4 MANITOBA

Training for Licensed Practical Nurses is provided at Kewatin Community College, Assiniboine Community College, Red River Community College, and at St. Boniface Hospital.

EXHIBIT 2
TRAINING PROGRAM FOR PSYCHIATRIC NURSING IN WESTEN CANADA
PROJECTED NUMBER OF AVERAGE ENROLMENTS AND GRADUATES

Province and Institution	Projected Number of Average Enrolments and Graduates										Source
	Enrolments					Graduates					
	1981	1982	1983	1984	1985	1981	1982	1983	1984	1985	
British Columbia											
B.C. Institute of Technology	120	138	120	120		131	131	110	110		1
Douglas College	30	30	30	30		15	15	15	15		1
Alberta											
Alberta Hospital - Edmonton	50	50	50	50	50	20	20	20	20	20	2
Alberta Hospital - Ponoka	40	40	40	40	40	20	20	20	20	20	3
Saskatchewan											
Wascana	135	135	135	135	135	52	70	73	75	75	4
Manitoba											
Brandon Mental Health Centre	40	40	40	40	40	30	30	30	30	30	5
Man. School for Mentally Retarded	26	26	26	26	26	22	22	22	22	22	6
Selkirk Mental Health Centre	40	40	40	40	40	37	37	37	37	37	7

Source:

1. Produccion 79 - Page 202
2. Director - School of Nursing, Alberta Hospital Edmonton
3. Associate Director Nursing Education, Alberta Hospital Ponoka
4. Health Science Education Statistics, Saskatchewan Continuing Education
5. Director Brandon School of Nursing
6. Registrar Manitoba School for Mentally Retarded
7. Registrar Selkirk School of Nursing

SECTION 3
TRAINING PROGRAM FOR PSYCHIATRIC NURSING

3.0 WESTERN CANADA

There are eight programs for Psychiatric Nursing in Western Canada with a potential to graduate approximately 360 per annum. (Note Exhibit 2)

3.1 BRITISH COLUMBIA

British Columbia Institute of Technology

There are two training programs for Psychiatric Nursing in British Columbia. The program at British Columbia Institute of Technology is of twenty-two months duration. Enrolment quota in the program are set at 120, although discussion has taken place to admit partial program students, (e.g., Licensed Practical Nurses and Registered Nurses wishing to qualify as Psychiatric Nurses) and to increase enrolment quota by twenty places per year from 1981 to a maximum of 200 in 1984. It should be noted, however, that enrolment in the program is currently 55, (less than half the planned enrolment).

Douglas College

Douglas College offers a twelve month program in Psychiatric Nursing for graduates of the one year Basic Nursing program. Enrolment quota of 30 has been filled for this year, although it is estimated that approximately 15 graduate from the program.

3.2 ALBERTA

Training for Psychiatric Nursing is currently provided in the two Psychiatric Hospitals in the province, Alberta Hospital - Edmonton, and Alberta Hospital - Ponoka. The program length is two years, and historically approximately 40% of enrolments qualify on completion of training.

3.3 SASKATCHEWAN

The two year program at Wascana Institute is the only training program for Psychiatric Nurses in Saskatchewan. Enrolments have averaged 135 for the last three years and approximately 45% of enrolling students have graduated from the program.

3.4 MANITOBA

There are three programs for Psychiatric Nursing in Manitoba. These are located at:

- Brandon Mental Health Centre
- Manitoba School for Mentally Retarded, Portage La Prairie
- Selkirk Mental Health Centre

The program directors estimate a 90% graduation rate from the programs, but recent graduation levels indicate that approximately 50% of enrolments graduate.

EXHIBIT 3

TRAINING PROGRAM FOR REGISTERED NURSES IN BRITISH COLUMBIA - BASIC TRAINING
PROJECTED NUMBER OF AVERAGE ENROLMENTS AND GRADUATES

Province and Institution	Projected Number of Average Enrolments and Graduates										Source
	Enrolments					Graduates					
	1981	1982	1983	1984	1985	1981	1982	1983	1984	1985	
University - Degree											
University of B.C.	113	113	113	113	113	85	85	85	85	85	1
University of Victoria		82	82	82	82						1
Community College		496	496			383					
B.C. Institute of Technology	120	120	120	120	120	110	110	110	110	110	2,8
Camosun College	128	128	128	128	128	101	101	101	101	101	3,8
Cariboo College	65	65	65	65	65	55	55	55	55	55	4,8
College of New Caledonia	64	64	64	64	64	55	55	55	55	55	5,8
Douglas College	75	75	75	75	75	65	65	60	60	60	1,8
Okanagan College	55	55	55	55	55	41	41	41	41	41	6,8
Selkirk College	36	36	36	36	36	20	20	20	20	20	1,8
Vancouver Community College	120	120	120	120	120	105	120	120	120	120	1,8
Hospital Programs	663	663	663	663	663	552	552	547	547	547	
Vancouver General	140	140	140	140	140	120	120	120	120	120	7,8

Source:

1. Registrar - University of British Columbia
2. Production 79 - Page 202
3. Registrar - Camosun College
4. Registrar - Cariboo College
5. Registrar - College of New Caledonia
6. Registrar - Okanagan College
7. Registrar - Vancouver General Hospital School of Nursing
8. Management Services, Post Secondary Department, Ministry of Education

SECTION 4

TRAINING PROGRAMS FOR REGISTERED NURSES

INTRODUCTION

The description of current training programs for Registered Nursing in Western Canada has been divided into three sections:

- Basic Training (Introductory Skills)
- Refresher Training
- Upgrading Training

Within each of these sections, the existing training programs are discussed for each province.

4.0 BASIC TRAINING/INTRODUCTORY SKILLS

There are three types of basic training provided for Registered Nurses:

- Baccalaureate Nurse
- Diploma Nurse - Community College/Institute
- Diploma Nurse - Hospital School of Nursing

4.1 BRITISH COLUMBIA

The estimated enrolments and graduates for basic Registered Nursing training programs are shown in Exhibit 3.

Baccalaureate Nurses

There is one basic four year degree Nursing Program at the University of British Columbia (U.B.C.). The intake is projected to be 113 per year with approximately 75% of the initial enrolments graduating from the program.

EXHIBIT 4

TRAINING PROGRAM FOR REGISTERED NURSES IN ALBERTA - BASIC TRAINING

PROJECTED NUMBER OF AVERAGE ENROLMENTS AND GRADUATES

Province and Institution	Projected Number of Average Enrolments and Graduates										Source
	Enrolments					Graduates					
	1981	1982	1983	1984	1985	1981	1982	1983	1984	1985	
University - Degree											
University of Alberta	60	60	60	60	60	34	34	48	48	48	1,8
University of Calgary	64	72	72	72	72	48	50	50	50	50	2,8
	124	132	132	132	132	82	84	98	98	98	
Community College - Diploma											
Grant MacEwan	70	70	70	70	70	60	60	60	60	60	3,8
Medicine Hat	24	24	24	24	24	20	20	20	20	20	4,8
Mount Royal	85	85	85	85	85	80	80	80	80	80	5,8
Red Deer	60	60	60	60	60	55	55	55	55	55	6,8
Lethbridge	48	48	48	48	48	28	28	28	28	28	7,8
Fort McMurray*			30	30	30					25	8
Grande Prairie*		30	30	30	30				25	25	8
	291	321	351	351	351	243	243	243	268	293	
Hospital Programs											
Royal Alexandra Hospital	90	90	90	90	90	80	80	80	80	80	9,8
Misericordia Hospital	70	70	70	70	70	50	50	50	50	50	10,8
Foothills Hospital	130	130	130	130	130	105	105	105	105	105	11,8
University of Alberta	130	130	130	130	130	115	115	115	115	115	12,8
	420	420	420	420	420	350	350	350	350	350	
	835	873	903	903	903	675	677	691	716	741	

Source:

1. Faculty of Nursing - University of Alberta
2. Faculty of Nursing - University of Calgary
3. Registrar - Grant MacEwan Community College
4. Registrar - Medicine Hat College
5. Registrar - Mount Royal College
6. Registrar - Red Deer College
7. Program Director - Lethbridge College
8. Alberta - Advance Education and Manpower - Program Services, Health & Social Services Program
9. Registrar - Royal Alexandra Hospital School of Nursing
10. School of Nursing, Advanced Education & Manpower
11. School of Nursing, Advanced Education & Manpower
12. School of Nursing, Advanced Education & Manpower

At present, the four year degree program at U.B.C. is the only basic Registered Nursing degree program in British Columbia. The University of Victoria has a four year basic R.N. degree program approved for first enrolment in the Fall 1982.

Diploma Nurse - Community College/Institute

There are currently 8 college based Registered Nurse Diploma programs. The total projected intake is approximately 660 and it is estimated that approximately 500 will graduate. The estimates obtained from college sources tend to be more optimistic in etimating potential output at 565 (or 83% of enrolment).

Diploma Nurse - Hosptial School of Nursing

The only remaining Hospital School of Nursing is at the Vancouver General Hosptial. This program has a planned intake of 140 per annum, and an estimated output 120 (86% of enrolment).

4.2 ALBERTA

The estimated enrolments and graduates for basic Registered Nursing training programs are shown in Exhibit 4.

Baccalaureate Nurse

There are two four year degree Nursing Programs in Alberta. The program at the University of Alberta has an enrolment quota of 60, and the program at the University of Calgary has a planned enrolment of 64. A funding request has been submitted to the Academic Planning Council, University of Calgary for approval to expand this program to an enrolment of 72 per annum effective Fall 1982.

EXHIBIT 5
TRAINING PROGRAM FOR REGISTERED NURSES IN SASKATCHEWAN - BASIC TRAINING
PROJECTED NUMBER OF AVERAGE ENROLMENTS AND GRADUATES

Province and Institution	Projected Number of Average Enrolments and Graduates										Source
	Enrolments					Graduates					
	1981	1982	1983	1984	1985	1981	1982	1983	1984	1985	
University											
University of Saskatchewan	80	80	80	80	80	70	70	70	70	70	1
College											
Kelsey	200	200	200	200	200	170	170	170	170	170	1
Wascana	150	150	150	150	150	120	120	120	120	120	1

Source:

1. Health Science Education Statistics - Saskatchewan Continuing Education

Diploma Nurse - Community College/Institute

There are currently five college based diploma programs for Registered Nurses. The total projected enrolment in these programs is approximately 310 and it is estimated that 240 will graduate.

The development of additional college based diploma registered nurse training programs has been discussed for Grande Prairie Regional College and Fort McMurray. The acutal starting dates for these programs has not been determined. The anticipated enrolment quotas are projected at 25 to 30 per year.

Diploma Nurse - Hospital School of Nursing

There are four hospital based Schools of Nursing in the province. The combined annual enrolments for these programs are 420 per annum, and it is estimated that approximately 350 graduate per annum.

4.3 SASKATCHEWAN

The estimated enrolments and graduations for basic Registered Nursing training programs are shown in Exhibit 5.

Baccalaureate Nurse

There is one four year degree Nursing Program in Saskatchewan, located at the University of Saskatchewan with an annual enrolment of 80 and estimated graduation of 50.

Diploma Nurse - Community College/Institute

There are two institute based diploma programs for Registered Nurses. The total projected enrolment in these programs is 370 and graduation is estimated at 310 per annum.

EXHIBIT 6
TRAINING PROGRAM FOR REGISTERED NURSES IN MANITOBA - BASIC TRAINING
PROJECTED NUMBER OF AVERAGE ENROLMENTS AND GRADUATES

Province and Institution	Projected Number of Average Enrolments and Graduates										Source
	Enrolments					Graduates					
	1981	1982	1983	1984	1985	1981	1982	1983	1984	1985	
Bachelor & Nursing Degree											
University of Manitoba	80	80	80	90	90						
Diploma .R.N.											
Community College	100	100	100	100	100	85	85	85	85	85	1
Red River Community College	110	110	110	110	110	78	84	92	92	92	1
Hospital											
Brandon General	60	60	60	60	60	40	48	48	48	48	1
Grace General	80	80	80	80	80	52	55	55	55	55	1
Health Sciences	150	150	150	150	150	60	95				1
Misericordia	75	83	60	60	60	36	75	50	50	50	1
St. Boniface General	112	112	112	112	112	55	80	80	80	80	1

Source:

1. Research Section, Department of Health

Diploma Nurse - Hospital School of Nursing

There are no nursing programs at the hospital level in Saskatchewan.

4.4 MANITOBA

The estimated enrolments and graduates for basic Registered Nursing training programs are shown in Exhibit 6.

Baccalaureate Nursing

There is one basic four year degree Nursing Program at the University of Manitoba. The current enrolment is 70, and it is planned to expand to 80 effective 1983.

The University of Brandon has made application to the Universities Council for funding for a degree R.N. program, although no decision has been made to date.

Diploma Nurse - Community College/Institute

There is one diploma Nursing training program offered at Red River Community College, with an annual enrolment of 110.

Diploma Nurse - Hospital School of Nursing

There are 5 Hospital based Schools of Nursing in the province. The combined annual enrolments for these programs are 487 per annum with an estimated output of approximately 360 per annum.

SECTION 2 - REFRESHER TRAINING

Refresher training programs are primarily intended to provide an opportunity for inactive Registered Nurses to undergo formal refresher training to ensure that skills are current and to enable re-entry to the active labour market. Annual enrolments for refresher training are reviewed continuously and the number of programs presented will depend on the demand for places.

EXHIBIT 7

TRAINING PROGRAM FOR REGISTERED NURSES (REFRESHER) IN WESTERN CANADA

PROJECTED NUMBER OF AVERAGE ENROLMENTS AND GRADUATES

Province and Institution	Projected Number of Average Enrolments and Graduates										Source
	Enrolments					Graduates					
	1981	1982	1983	1984	1985	1981	1982	1983	1984	1985	
British Columbia											
B.C. Institute of Technology	60										1
Camosun College	20										1
Capilano College	20										1
Cariboo College	40										1
East Kooenay Community College	20										1
Fraser Valley College	20										1
Malaspina College	20										1
Vancouver Community College	20										1
Selkirk College	20										1
	240										
Alberta											
Medicine Hat College	20										2
Grande Prairie College	10										2
Grant MacEwan Community College	214										2
Lakeland College	10										2
Lethbridge College	27										2
Mount Royal	44										2
Red Deer College	22										2
Foothills Hospital	69										2
University of Alberta Hospital	40										2
	99										
	546										
Saskatchewan											
Kelsey Institute	25										3
Wascana Institute	60										3
	85										
Manitoba											
Red River Community College	120										4
Assiniboine Community College	30										5
	150										

Source:

1. Management Services, Post Secondary Department, Ministry of Education
2. Alberta Advanced Education and Manpower, Program Services, Health & Social Services Program
3. Health Science Education Statistics, Saskatchewan Continuing Education
4. Health Programs Department Red River Community College
5. Program Director Assiniboine College

Exhibit 7, shows the planned refresher training programs for 1981-82 and the potential enrolments.

BRITISH COLUMBIA

There are 9 refresher programs planned with enrolemnts at 240, and an estimated graduation of 190 per annum.

ALBERTA

There are 10 refresher programs planned with projected enrolments at 516 and anticipated output of 416. In future years it is projected that outputs will stabilize at between 250 to 300.

SASKATCHEWAN

There are two refresher training programs with enrolments of 85 located at Kelsey Institute and Wascana Institute.

MANITOBA

There are two refresher training programs located at Red River Community College and Assiniboine Community College. Anticipated enrolments are 160.

3.0 UPGRADING TRAINING

Upgrading training is divided into the following categories:

- o Upgrading from related occupation to Registered Nursing
- o Upgrading from Diploma R.N. to Degree level R.N.

EXHIBIT 8
TRAINING PROGRAM FOR REGISTERED NURSES (UPGRADING) IN WESTERN CANADA
PROJECTED NUMBER OF AVERAGE ENROLMENTS AND GRADUATES

Province and Institution	Projected Number of Average Enrolments and Graduates										Source
	Enrolments					Graduates					
	1981	1982	1983	1984	1985	1981	1982	1983	1984	1985	
British Columbia											
New Caledonia	18	18	18	18	18	70	18	18	18	18	1
Alberta											
Grant MacEwan Comm. College	20	20	20	20	20	15	15	15	15	15	2
Red Deer College	12-15	12-15	12-15	12-15	12-15	5	5	5	5	5	2

Source:

1. Production 79 - Page 202

EXHIBIT 9

TRAINING PROGRAM FOR REGISTERED NURSES IN UPGRADING (TO R.N.) IN WESTERN CANADA
PROJECTED NUMBER OF AVERAGE ENROLMENTS AND GRADUATES

Province and Institution	Projected Number of Average Enrolments and Graduates										Source
	Enrolments					Graduates					
	1981	1982	1983	1984	1985	1981	1982	1983	1984	1985	
British Columbia											
University of Victoria	60	60	60	60	60	50	50	50	50	50	1
University of B.C.	75	75	75	75	75	60	60	60	60	60	2
										0	
Alberta											
University of Alberta	108	144	144	144	144	90	90	90	90	90	3
University of Calgary	50	50	50	50	50	48	48	48	48	48	3
Saskatchewan											
University of Saskatchewan	12	12	12	12	12	9	9	9	9	9	4
Manitoba											
University of Manitoba	80	90	90	90	90	50	50	50	50	50	5

Source:

1. Registrar - University of Victoria
2. Program Director - University of British Columbia
3. Alberta Advanced Educaiton and Manpower, Program Services, Health & Social Services Program
4. Health Science Education Statistics, Saskatchewan Continuing Education
5. Research Department, Ministry of Health

Upgrading From Related Occupation to Registered Nurse

Training programs for related occupations upgrading to Registered Nursing are shown in Exhibit 8.

BRITISH COLUMBIA

The "ACCESS" program at New Caledonia College is intended to provide the opportunity for licensed Practical Nurses to receive the required training for licensing as a Registered Nurse.

ALBERTA

There are upgrading courses available through Grant MacEwan Community College and Red Deer College to allow Registered Psychiatric Nurses upgrade to Registered Nurse Level.

SASKATCHEWAN

The building program for Diploma Nurses is provided at Kelsey Institute.

Upgrading For Diploma R.N. To Degree Level R.N.

The programs for upgrading from diploma Level R.N. to Degree Level Registered Nursing are shown in Exhibit 9.

BRITISH COLUMBIA

There are two upgrading programs in British Columbia. These are located at the University of Victoria and the University of British Columbia. Planned enrolments are 135 and anticipated graduation is 110.

ALBERTA

There are two degree upgrading programs in Alberta, located at the University of Alberta and the University of Calgary. The University

of Alberta program is also offered at Red Deer College. Enrolments are 194, and anticipated graduations are 138.

SASKATCHEWAN

The University of Saskatchewan offers a degree upgrading program, with planned enrolment of 12.

MANITOBA

The University of Manitoba offers diploma R.N. upgrading programs to a Bachelor of Nursing with projected enrolments of between 80 and 90.

Both the University of Brandon and the University of Winnipeg have made application to the Universities Grants Commission for funding to set up Registered Nursing degree upgrading programs.

Province of
British Columbia

Province of
Alberta

Province of
Saskatchewan

Province of
Manitoba

WESTERN CANADA
HEALTH MANPOWER TRAINING STUDY

Category #4 - Report XX

REGISTERED NURSES

Report XX - REGISTERED NURSES
Report XXI - PSYCHIATRIC NURSES

REPORT XX

REGISTERED NURSES

THE REQUIREMENT FOR ALTERNATIVE TRAINING AND FUNDING ARRANGEMENTS IN WESTERN CANADA

WESTERN CANADA HEALTH MANPOWER TRAINING STUDY
CATEGORY #4 - REPORT XX
REGISTERED NURSES

TABLE OF CONTENTS

		PAGE
I -	INTRODUCTION	I-1
	Study Background	I-1
	Study Objectives	I-1
	Study Approach	I-2
	Scope of this Report	I-4
	Report Format	I-7
II -	PROJECTED SUPPLY AND REQUIREMENT FOR REGISTERED NURSES IN THE WESTERN REGION	II-1
	Western Canada Overview	II-1
	Timing and Location of Manpower Requirements	II-7
	Summary	II-10
III -	PRESENT AND FUTURE MANPOWER STRATEGIES	III-1
	Existing Training Programs	III-1
	Occupational Issues	III-5
	Alternative Manpower Strategies	III-10
IV -	RECOMMENDATIONS	IV-1
	Western Region Recommendations	IV-1
	Provincial Recommendations	IV-6
	British Columbia	IV-7
	Alberta	IV-9
	Saskatchewan	IV-11
	Manitoba	IV-13

EXHIBITS		Opposite Page
1.	Projected Supply and Requirement for F.T.E. Registered Nurses in the Western Region	II-1
2.	Projected Supply and Requirement for F.T.E. Registered Nurses (By Province)	II-7
3.	Training Program Output of Registered Nurses in the Western Region in 1981	III-1
4.	Effect of Implementing Strategy A on the Projected Supply and Requirement for F.T.E Registered Nurses	III-14

TABLE OF CONTENTS - CONT'D

EXHIBITS

		Opposite Page
5.	Effect of Implementing Strategy B on the Projected Supply and Requirement for F.T.E. Registered Nurses	III-16
6.	Effect of Implementing Strategy C on the Projected Supply and Requirement for F.T.E. Registered Nurses	III-18
7.	Effect of Various Alternative Strategies on the Projected Supply and Requirement for F.T.E. Registered Nurses in the Western Region	III-19

TABLES

		Page
1.	Projected Net Requirement for F.T.E. Registered Nurses in Western Canada 1981 - 2000	II-7
2.	Projected Net Requirement for Full-Time Equivalent Registered Nurses	II-10
3.	Present and Future Entry-Level Training Outputs in the Western Region	III-13
4.	Net Requirement for F.T.E. Registered Nurses in Western Canada under Alternative Strategies	III-20

APPENDICES

		Page
A -	Study Approach and Methodology	A-1
B -	Provincial Net Manpower Requirements	B-1
C -	Bibliography	C-1

I - INTRODUCTION

This section sets out the overall study background, objectives and approach to the Western Canada Health Manpower Training Study. The scope of this report on registered nurses in the western region and the report format are also described in this section.

STUDY BACKGROUND

The provision of effective health services to the community is, to a considerable degree, dependent on three essential resources:

- an adequate supply of well trained staff in each health occupation group;
- the development of adequate facilities to service the community;
- the availability of adequate funds to ensure cost effective and efficient health services.

The range and complexity of health treatment programs has expanded greatly in Canada during the last twenty-five years. In addition, changing technology and the development of new treatment programs have resulted in an increased requirement for skilled, adequately trained health manpower. These factors have resulted in an increased emphasis on manpower planning and skill training for health occupations to ensure an adequate supply of trained practitioners to meet defined manpower requirements.

The nursing professions represent nearly two-thirds of all trained health occupational groups in western Canada and are an integral component of the health care system. The provision of high quality nursing services is dependent not only on an adequate supply of well trained staff, but also on the participation of these trained individuals in the active work force.

STUDY OBJECTIVES

The Western Canada Health Manpower Training Study was initiated by the western Premiers at their annual conference in 1980.

The objectives of the study were to:

- assess the existing and future need for health manpower training programs and facilities in western Canada; and
- make recommendations for the rationalization of the location and funding of health manpower training programs and facilities in western Canada.

STUDY APPROACH

The study was under the direction of a Steering Committee consisting of health and education government representatives from the provinces of British Columbia, Alberta, Saskatchewan and Manitoba. The study took place over two years and consisted of a review of 26 health occupations grouped into five categories.

Each occupation was studied separately and a report has been produced for each. In addition, a report examining the interrelations of the occupations within each category has been submitted to the Steering Committee. Category 4 comprised the following occupations:

- Registered Nurses
- Nursing Assistants
- Psychiatric Nurses

Data was collected from provincial associations and from government agencies for each of the occupations. For the nursing occupations, data was collected on the numbers of individuals registered with the association over the last five years and the current status of these individuals as active or inactive practitioners. An attempt was also made to gather data on historical trends, the number of graduates from training, trends in movement of active practitioners to inactive status and occupational shifts out of the profession, trends in migration to or from other provinces, and immigration and emigration.

In the cases where validated and reliable information was not available, association spokesmen, nursing employers and individuals in each of the nursing occupations were interviewed to provide qualitative opinions regarding present and future trends affecting the supply of and requirement for nurses. Because of the relatively mobile nature of individuals working in the nursing profession, interviews were also held with nursing associations and health manpower planners in other provinces in Canada and in the United States.

An extensive literature review was conducted to examine the problems facing the nursing occupations, relevant research which has been undertaken with regard to these problems, and the solutions proposed by others. Earlier studies conducted by nursing associations, hospital associations and manpower planning commissions, as well as recent journal articles were also reviewed. A bibliography of the literature reviewed is contained in Appendix C to this report.

A computerized forecasting model was used to assist in the preparation of projections on the future supply and requirement for each occupation. A critical analysis of these twenty-year projections was undertaken to develop the various supply and requirement scenarios presented in this report.

The lack of a consistent historical data base made it difficult to develop accurate or reliable long-range projections of supply or requirement for the nursing occupations. The supply and requirement projections contained in this report are as accurate as can be achieved in light of the limited data base now available.

A decision-making process to evaluate alternatives for future funding and location of training programs was developed for this study. In the nursing occupations, each province presently has its own entry-level and refresher training programs offered at various settings. The study focused on the general requirement for training programs rather than on the specific level or length of training to be provided. The funding of these programs was not examined, as each province is responsible for its own training programs for

the nursing occupations.

The scope of this study of the nursing occupations was expanded to examine manpower planning strategies other than training. This approach was adopted to address the particular problems facing the nursing occupations which significantly impact on the projected supply in both the short and longer term.

Separate documents describing the manpower planning methodology and the training decision-making process were issued. A brief summary of the overall study approach and methodology is set out in Appendix A, and details of the provincial net requirements are set out in Appendix B.

SCOPE OF THIS REPORT

In Category 4, three nursing professions were studied: registered nurses, nursing assistants and psychiatric nurses. This report summarizes the findings and recommendations for the registered nurse occupation. A separate report has been prepared for each of the other two occupations.

For the purposes of this study, a registered nurse is defined as an individual who:

> "Provides total nursing care for patients in hospitals, nursing homes, extended-care facilities and other establishments. Discusses and plans total nursing care of assigned patients with physician and other members of health team. Directs activities of nursing care of patients. Administers prescribed medications and treatments. Observes, records and reports symptoms and changes in patients' condition. Makes nursing rounds and accompanies physician on medical rounds to evaluate needs of individual patients and to assess effectiveness of nursing care. Counsels patients and family in health care and treatment to be continued at home. Directs or carries out established procedures to prepare essential facilities and equipment, and assists physician in examinations, treatments, surgery and deliveries. Performs nursing activities in obstetrics, paediatrics, orthopaedics and other clinical specializations".[1]

1 Canadian Classification and Dictionary of Occupations, No. 3131-130, 1980.

Calculation of Full-time Equivalents (F.T.E.)

Over the last five years, there has been a significant change in the proportion of registered nurses working on a full-time as compared to a part-time basis. In 1975, approximately 80% worked full-time and 20% worked part-time. It is estimated that in 1980, approximately 60% of the active registered nurses in western Canada worked on a full-time basis (ranging from 37.5 hours to 40 hours per week depending upon agreements in each province), and approximately 40% worked on a part-time basis. There is no validated information on the number of hours worked by each part-time registered nurse, and no consistent definition of the term part-time. All requirements for registered nurses in this report have been expressed in terms of full-time equivalents. A full-time equivalent is defined as the number of registered nurses required to make up one full-time position. For example, a registered nurse working full-time represents 1.0 full-time equivalent. A registered nurse working part-time represents a fraction (such as 0.3, 0.4, or 0.5) of a full-time equivalent depending upon the number of hours worked. For purposes of this report, part-time registered nurses have been calculated to represent 0.4 of a full-time equivalent for the provinces of British Columbia, Alberta and Saskatchewan. This is believed to be the status quo, but this key assumption could not be validated. In Manitoba, government representatives believe that part-time registered nurses represent 0.5 of a full-time equivalent and this assumption has been used in all calculations for the province of Manitoba throughout this report. A further discussion of the hours worked by part-time registered nurses and the effect this has on the projections in this report is contained in Appendix B.

Net Occupational Shift Factor

One of the most important factors affecting the projected supply of registered nurses in western Canada is the net occupational shift factor. This factor has been defined as the net movement of registered nurses from active to inactive status or from inactive to active status; movement into the profession from another profession or movement out of the active nursing profession to another profession; and attrition due to death or retirement.

Historically this factor has been erratic and the reasons for this are not specifically identifiable. In developing the supply projections for this report, two net occupational shift values were used to demonstrate the extreme sensitivity of this factor. The factors of -8% (approximating a 12 year working life for each full-time equivalent) and -10% (approximating a 10-year working life for each full-time equivalent) were selected as a reasonable range on which to develop the supply projections contained in this report. These two values were selected following discussions with professional associations and nursing employers. There is no information available to validate this key assumption. Because of the extreme sensitivity of this key factor and the lack of validated evidence to support the selection of the -8% or -10% value used, the supply projections contained in this report should be examined with careful consideration to the assumptions used in their development. For a detailed discussion of the net occupational shift factor, refer to Appendix B, pages B-5 to B-9.

Limitations of the Data

As indicated earlier, difficulties were encountered because of the lack of a consistent, historical data base for the nursing occupations. The lack of consistency relates both to interprovincial and intraprovincial data. Both the method of data collection and the presentation of data differs among the provinces studied. In addition, in some provinces, the data collected by governmental agencies and professional associations is at variance. The data base available on registered nurses had serious limitations which made it difficult to make long-range projections with any degree of accuracy. In this report, projections were prepared for both supply and requirement from 1981-2000. For planning purposes, however, it would be prudent to focus attention on the 1981-1985 timeframe, because of the difficulties associated with making informed judgements on the basis of the limited data now available. The projections of manpower requirements contained in this report are extremely sensitive to the net occupational shift factor. There was no validated data available on which to base this key assumption. Therefore we would caution the reader to take this into consideration prior to making any significant training decisions.

REPCRT FORMAT

A series of working papers specific to this occupation were prepared and submitted to the Steering Committee. These working papers included:

- calculation of full-time equivalents for the historical supply of registered nurses (1975-1980);
- scope of existing training programs for registered nurses in western Canada;
- preliminary findings regarding historical and projected supply and requirements; and
- preliminary training recommendations.

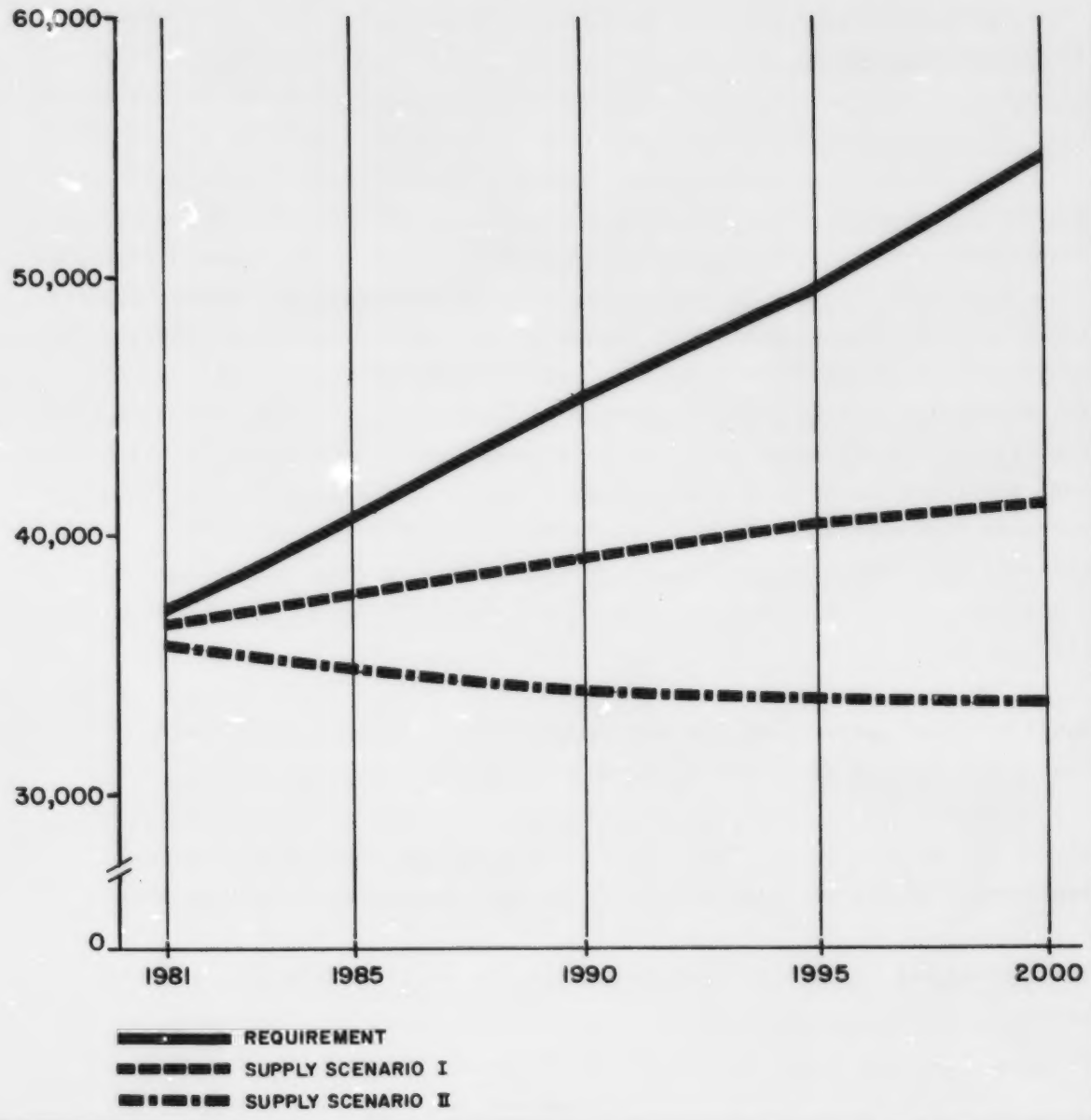
The general background of the study on the registered nurse occupation has been provided in this section of the report. Section II summarizes the projections of the future supply and requirement for registered nurses in western Canada and the timing and location of these manpower requirements in each province.

Section III examines present and future manpower strategies and the occupational issues affecting the supply and requirement for registered nurses. Three alternative future manpower planning strategies are assessed. Section IV contains recommendations for this occupation. The three appendices provide further supporting detail on various aspects of this study as follows:

- Appendix A - Study Approach and Methodology
- Appendix B - Provincial Net Manpower Requirements
- Appendix C - Bibliography.

EXHIBIT I

PROJECTED SUPPLY AND REQUIREMENT FOR F.T.E. REGISTERED NURSES IN THE WESTERN REGION



II - PROJECTED SUPPLY AND REQUIREMENT FOR REGISTERED NURSES IN THE WESTERN REGION

This section summarizes the projections of the supply and requirement for full-time equivalent registered nurses in the western region and the timing and location of these manpower requirements on a provincial basis. Further details of the methodology used and the assumptions made in developing the most likely supply and requirement projections for each province are contained in Appendices A and B.

WESTERN CANADA OVERVIEW

Exhibit 1, opposite, shows two projected supply scenarios and a projected requirement for full-time equivalent registered nurses in the western region from 1981-2000. The supply projection shown as Scenario I, in Exhibit 1, is based on a net occupational shift factor of -8% (or an average working life of 12 years). Scenario II is based on a net occupational shift factor of -10% (or an average working life of 10 years). The Exhibit indicates that under Scenario I, the projected supply will increase from approximately 36,000 in 1981 to 41,000 in the year 2000. Under Scenario II the projected supply will decrease from approximately 35,000 in 1981 to 33,000 in the year 2000. Over the same timeframe, the requirement or demand for full-time equivalent registered nurses will increase from approximately 37,000 in 1981 to 54,000 in the year 2000.

Based on these projections, the net requirement or shortage of full-time equivalent registered nurses in the western region will range from approximately 700 to 1,400 in 1981. The shortage will range from 13,000 to 21,000 in the year 2000. These two supply scenarios indicate the extreme sensitivity of the net requirements to the net occupational shift factor.

The factors and assumptions used to develop these projections are set out below.

Projected Supply

The projected supply scenarios shown in Exhibit 1 are based on the analysis of the output from a computer program developed for this study.

An "opening stock" figure representing the number of active full-time equivalent nurses registered in each province was used as the initial calculation point. This figure was determined using data provided by the respective registered nurses' associations. The breakdown between full-time and part-time active registered nurses was estimated to be approximately 60% full-time and 40% part-time in 1980. Each part-time registered nurse in British Columbia, Alberta and Saskatchewan was estimated to represent 0.4 full-time equivalent. In Manitoba, each part-time registered nurse was estimated to represent 0.5 full-time equivalent. It was assumed that the breakdown between full-time and part-time would remain unchanged from 1980-2000, although there is no evidence to support this assumption.

Based on the opening stock figure developed, the computer then added or subtracted a numerical or percentage value assigned to each of the following supply factors:

- net migration - defined as the movement of registered nurses from one province to another province. Migration into each province was subtracted from migration out of that province to arrive at a net migration factor.

- net immigration - defined as the movement of registered nurses from one country to another country. The number of emigrants from each province was subtracted from the number of immigrants to that province to arrive at a net immigration factor.

- training output (entry-level) - defined as the number of anticipated graduates from basic or entry-level programs for registered nurses in each province. Each entry-level training output was assumed to represent one full-time equivalent.

- training output (refresher level) - defined as the number of anticipated graduates from refresher level programs offered to registered nurses in each province. Each refresher level training output in British Columbia and Alberta was assumed to return to the active workforce on a part-time basis, and was calculated to represent 0.4 full-time equivalent. Ninety percent of refresher level training outputs in Manitoba were assumed to return to the active workforce on a full-time basis and the remaining 10% were calculated to represent 0.5 full-time equivalent. In Saskatchewan, 75% of refresher level training outputs were assumed to work part-time as 0.4 full-time equivalent and 25% were assumed to work full-time.

- net occupational shift - defined as the net movement of full-time equivalent registered nurses from active to inactive status or from inactive to active status; movement into the profession from another profession or movement out of the active nursing profession to another profession; and attrition due to death or retirement.

Values were assigned to each of these key factors based on historical trends revealed through analysis of the data from the respective registered nurses' associations, interviews with association and government spokesmen, and a review of literature and recent studies conducted by others.

Net migration and net immigration values were obtained through a review of nursing association historical data from 1975-1980. The database available reflects only those nurses who have requested verification of their status with provincial associations. The degree of participation of these migrants or immigrants in the workforce (as part-time or full-time workers) was unknown. However, it is believed to be reasonable to assume that since these professionals had requested active registration status, they were likely to enter the workforce. No data was available to substantiate this assumption. Similarly, no data was available to support or contradict the assumption that the historical trend in net migration and net immigration would continue from 1981-2000.

No factual information was available on the proportions of entry-level and refresher level training outputs entering the active workforce on a full-time

or part-time basis. It seemed reasonable to assume, however, that a new graduate from an entry-level program would enter the labour force as a full-time worker. There is no information available to validate this assumption. Similarly, in view of the lack of information on the participation of refresher-level outputs in Alberta and British Columbia, it was assumed that all refresher-level outputs successfully complete the program and return to the active workforce on a part-time basis. In Manitoba, it is estimated that 90% of refresher outputs enter the workforce on a full-time basis and 10% enter on a part-time as 0.5 full-time equivalents. In Saskatchewan, it is estimated that 75% return to the workforce on a part-time basis and 25% return on a full-time basis after completing refresher training. The different treatment of refresher outputs in Saskatchewan and Manitoba was the result of discussions with government representatives. There is no validated information to support these assumptions, nor to support the assumption that what may be happening currently will continue throughout the forecast period.

The percentage value used for the net occupational shift factor approximates an average working life of full-time equivalent registered nurses. For example, if the net occupational shift is assumed to be -8%, this would approximate a 12 year working life. A registered nurse who works 6 years full-time and 12 years part-time at 0.5 full-time equivalent would have a 12 year working life. If that same nurse had worked 6 years full-time and 12 years part-time at 0.4 full-time equivalent, she would have an average full-time equivalent working life of 10.8 or 11 years.

Because of the lack of validated data with respect to the net occupational shift factor, a number of sensitivity analyses were undertaken to assess the impact any percentage change would have on the future supply projections. Analyses were done using a net occupational shift factor of -5% (20 year working life), -6.5% (15 year working life), -8% (12 year working life), -10% (10 year working life), and -12% (8 year working life). Based on discussions with professional associations and nursing employers, -8% and -10% net occupational shift were selected as a reasonable range on which to base supply projections. The supply projections are extremely sensitive to the net occupational shift factor and the lack of factual, validated information on this factor must be taken into consideration when examining the projected net

requirements. It cannot be overemphasized that this key factor significantly impacts the projected supply scenarios. Net occupational shift factors of -8% and -10% were selected as being the two most likely scenarios for this report, but there is no information available to validate this key assumption.

The two supply projections, shown in Exhibit 1, are as accurate as can be achieved in light of the lack of historical data and the key assumptions which have been used to project future supply. Because of the lack of a validated historical data base to develop these projections and the extreme sensitivity of the projections to the unvalidated assumptions made with respect to the net occupational shift factor, attention should be focussed on the supply projections during the 1981-1985 timeframe.

Projected Requirement

Three methods of determining future requirements for health occupations in western Canada were considered in this study. These were:

- service target method;
- population ratio method; and
- service utilization method.

The methodology for each of these three methods is contained in Appendix A.

The service target method requires that a target level of practitioners has been developed. As there are no defined service target ratios for registered nurses in western Canada or elsewhere, this approach was not used. The population ratio method was not used as it projects the current status quo into the future.

The projected requirement for full-time equivalent registered nurses as set out in Exhibit 1 was therefore based on the service utilization method. This method projects the number of active treatment patient days and the number of full-time equivalent registered nurses required to meet this level of service in future, based on medium population growth. This approach makes four key assumptions. It assumes that:

- the number of full-time equivalent nurses to the number of patient days in 1980 will be an acceptable level of service in future;
- the pattern of utilization of hospital beds by age and sex cohort in 1980 will remain the same in the future;
- there will be no major changes in technology or productivity which will impact on the future requirement for registered nurses; and
- active treatment hospital beds will be available in the western region to meet the projected number of patient days and the resulting requirement for registered nurses in the timeframe shown.

There was little historical information on which to assess past trends in the utilization of registered nurses. It has been suggested, however, that the ratio of full-time equivalent registered nurses to patient days in recent years has been less than ideal, but there was no information available to quantify what increased level of service would be considered adequate. The level of requirement shown assumes the current proportion of registered nurses, nursing assistants and other occupations will remain unchanged. If hospital staffing patterns move towards using only registered nurses, more full-time equivalents would be required.

The requirement projection shown in Exhibit 1 is as accurate as can be achieved in light of the key assumptions which have been made. As in the supply projections, it would be prudent to focus on the requirements projected over the 1981-1985 timeframe.

Net Requirement

The projected supply minus the projected requirement equals the net requirement for full-time equivalent registered nurses in the western region. Based on the analysis, it would appear that the net requirement or shortage of full-time equivalent registered nurses will be in the following range:

EXHIBIT 2

PROJECTED SUPPLY AND REQUIREMENT FOR F.T.E. REGISTERED NURSES

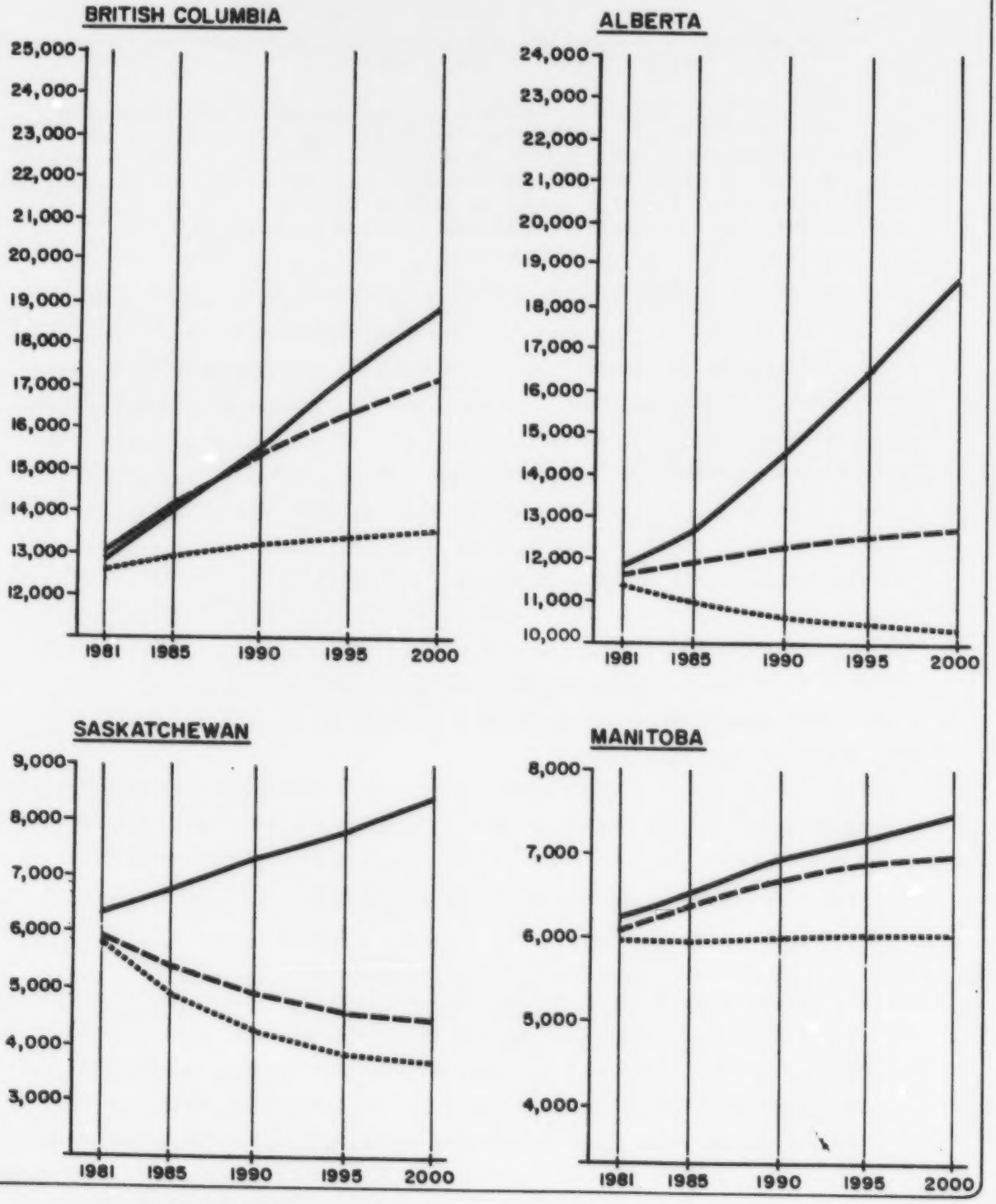


TABLE 1
PROJECTED NET REQUIREMENT FOR F.T.E. REGISTERED NURSES
IN WESTERN CANADA 1981 - 2000

Year	Scenario I Using the -8% net occupational shift factor	Scenario II Using the -10% net occupational shift factor
1981	700	1,400
1982	1,300	2,700
1983	1,900	3,900
1984	2,600	5,100
1985	3,200	6,200
1990	6,200	11,400
1995	9,500	16,200
2000	13,200	21,000

Note: All numbers have been rounded to the nearest hundred.

The importance of the full-time equivalent factor cannot be overemphasized. For example, the range of net requirements shown in Table 1 is based on a 60% full-time and 40% part-time workforce, with each part-time registered nurse representing 0.4 or 0.5 of a full-time equivalent. In order to make up one full-time equivalent with part-time registered nurses working 0.4, 2.5 active registered nurses would be required. If each part-time registered nurse represents 0.5 full-time equivalent; 2.0 active registered nurses would be required. A projected net requirement of 3,200 - 6,200 full-time equivalents in 1985 would therefore translate into a shortage of approximately 6,000 - 10,000 active registered nurses in western Canada.

Clearly this requirement for additional registered nurses reflects a severe problem for the western region in the short term (1981-1985), and the long range projections (1986-2000) indicate a significant shortage.

TIMING AND LOCATION OF MANPOWER REQUIREMENTS

In order to examine in more detail the timing and location of these projected shortages, Exhibit 2, opposite, sets out the projections of supply and requirement in each of the four western provinces. As in the previous Exhibit, two supply projections are shown. Scenario I assumes a -8% net occupational shift factor or an average working life of 12 years for each full-time equivalent registered nurse. Scenario II assumes a -10% net occupational shift or an average working life of 10 years.

British Columbia

In Scenario I British Columbia is presently experiencing a minor surplus of full-time equivalent registered nurses. Over the short term (1981 - 1985), this surplus is gradually reduced and, over the longer term, there is a projected shortage. Because of seasonal and geographic variations, as well as variations in the type and level of registered nurses required, this indicated surplus may not materialize.

Under Scenario II British Columbia is presently experiencing a shortage of full-time equivalent nurses and this shortage is projected to grow annually. Over the short term, the projected shortage increases from approximately 200 full-time equivalents in 1981 to 900 in 1985. Over the longer term, however, the shortage would be considerably more severe and by the year 2000 there would be a shortage of 5,400 full-time equivalents.

The requirement projections assume a moderate increase in population, and an unchanged pattern of utilization of registered nurses over the twenty year timeframe. British Columbia presently has a positive net migration of registered nurses, and it was assumed that this historical trend would continue.

Alberta

The requirement for registered nurses in Alberta is projected to increase substantially, based on the anticipated growth in population over the next twenty years. Medium population growth projections were used to derive the requirement for registered nurses. Based on planned construction of new hospital beds, the level of requirement shown may somewhat underestimate the actual requirement for registered nurses in the short-term.

In Scenario I Alberta is presently experiencing a shortage of full-time equivalent nurses, and this shortage increases from approximately 300 in 1981 to 1,700 in 1985. Over the longer term, the shortage increases to 7,000 full-time equivalents by the year 2000.

In Scenario II, the shortage is somewhat more severe and would increase from approximately 500 in 1981 to 2,600 in 1985. Under either scenario, the

province of Alberta faces a severe shortage of nursing manpower in the short term, and this situation would continue unabated to the year 2000 when there would be a projected shortage of approximately 7,000 to 9,300 full-time equivalents.

Saskatchewan

The level of projected requirement for full-time equivalent nurses in Saskatchewan over the next twenty years increases very moderately. However, the projected supply decreases rapidly. In part, this reflects the net occupational shift factors assumed to develop the supply scenarios, but Saskatchewan also has a negative net migration and negative net immigration of registered nurses out of the province. In recent years, the level of migration out of the province and out of the country has equalled or possibly even surpassed the level of training output, according to the Saskatchewan Registered Nurses Association.

In Scenario I, the graph indicates that Saskatchewan is presently facing a shortage of full-time equivalent registered nurses and this shortage grows from approximately 300 in 1981 to 1,400 in 1985. This level of shortage somewhat parallels that projected for Alberta.

In Scenario II, the projected shortage increases from approximately 400 in 1981 to 1,900 in 1985. Under either scenario, the province of Saskatchewan faces a severe nursing manpower shortage in the short and longer term, and by the year 2000 there would be a shortage of approximately 4,000-4,700 full-time equivalents.

Manitoba

As in Saskatchewan, the projected requirement for Manitoba increases moderately over the next twenty years. Manitoba has a negative net migration of registered nurses out of the province and there is no immigration to increase the supply. Manitoba plans to significantly increase its entry-level training output from 1982-2000 and the assumption that 90% of refresher-level output re-enter the workforce on a full-time basis significantly helps to

increase the projected supply of full-time equivalents.

In Scenario I, the graph indicates that Manitoba is currently experiencing a minor shortage of full-time equivalent registered nurses, and this shortage of approximately 100 continues from 1981 to 1985. This projected level of minor shortages, however, may be misleading as there are variations in the type and level of nurses required, as well as seasonal and geographic variations in requirements. Over the longer term, the projected shortage increases only very moderately and by the year 2000, there would be a shortage of approximately 500 full-time equivalents.

In Scenario II, Manitoba is currently experiencing a larger shortage and this shortage grows from approximately 300 full-time equivalents in 1981 to 600 in 1985. Over the longer term, under Scenario II, Manitoba faces greater shortages and by the year 2000, the shortage of full-time equivalent registered nurses would be approximately 1,500.

SUMMARY

Based on the projected supply scenarios and projected requirement shown in Exhibit 2, the net requirement for full-time equivalent registered nurses in each province is as follows:

TABLE 2
PROJECTED NET REQUIREMENT FOR FULL-TIME EQUIVALENT REGISTERED NURSES

	British Columbia		Alberta		Saskatchewan		Manitoba	
	Scenario I	Scenario II	Scenario I	Scenario II	Scenario I	Scenario II	Scenario I	Scenario II
1981	-100	200	300	500	300	400	100	300
1982	-100	400	600	1000	600	900	100	400
1983	-100	600	1000	1600	900	1200	100	400
1984	0	900	1400	2200	1200	1600	100	500
1985	0	1200	1700	2600	1400	1700	100	600
1990	300	2400	3300	4900	2500	3000	200	1000
1995	1000	4000	5000	7000	3300	4000	300	1300
2000	1800	5400	7000	9300	4000	4700	500	1500

NOTE: All numbers have been rounded to the nearest hundred. A minus sign indicates a surplus.

This level of projected net requirement for full-time equivalent registered nurses represents a shortage of nursing manpower in the short term and, in the longer term, the shortage worsens. It must be recognized, however, that these projections have been developed using a limited data base and that the two supply projections represent what we believe is a "best guess" without any hard, factual evidence to support the critical net occupational shift assumption. As indicated earlier, the requirement projection has been made without the benefit of a detailed assessment of how impending changes in the delivery of nursing care would impact upon requirements and we have been unable to validate whether the level of requirement indicated will materialize at the precise timeframes indicated. We would, therefore, caution the reader of this report to focus on the projections indicated during the 1981-1985 timeframe and to exercise caution in interpreting the shortages projected. The projections shown in 1981 may not readily compare with vacancy surveys undertaken in various provinces during that year and this will be discussed in more detail in Appendix B. The projections shown in Table 2, under Scenario I and II, represent the best estimates possible in light of the limited data base now available. Further details on the methodology, the net provincial requirements, and the level of confidence in the data used to develop the assumptions are set out in Appendices A and B.

In the following sections, present and alternative manpower strategies are examined in order to address the projected shortages over the short term, 1981-1985.

Peat, Marwick and Partners

EXHIBIT 3

TRAINING PROGRAM OUTPUT OF REGISTERED NURSES IN WESTERN REGION IN 1981

	BRITISH COLUMBIA	ALBERTA	SASKATCHEWAN	MANITOBA	WESTERN REGION TOTAL
Entry-level Training					
Hospital-based (2 years)	120(1)*	350(4)	-		
Community College (2 years)	552(8)	280(5)	287(2)	372(7)	
University (4 years)	85(1)	100(2)	70(1)		
Sub-total					2,216
Refresher					
Hospital-based		270(3)			270
Community College	190(9)	160(7)	48(2)	120(2)	518
Sub-total					788
Upgrading					
Related occupation to R.N.	18(1)	20(2)	(1)**		38
Diploma R.N. to Degree R.N.	110(2)	140(2)	9 (1)	49 (1)	308
Sub-total					346
Totals	1,075	1,320	414	541	3,350

* Number of programs are shown in brackets.

** Number of students not available; figures included in community college total.

Source: PMP survey of educational authorities in each province conducted in 1980. These figures represent anticipated outputs and may not match actual outputs.

III - PRESENT AND FUTURE MANPOWER STRATEGIES

This section examines the major factors influencing the present and future supply of registered nurses in the western region. These factors are broadly grouped as training programs and occupational issues. The latter encompasses all those issues that may influence decisions by registered nurses to leave or to re-enter the workforce and decisions by potential candidates to enter training programs. Finally, the impact of three alternative future manpower strategies are assessed in order to address the projected shortage over the next 5 years.

EXISTING TRAINING PROGRAMS

Increasing the number of graduates from a training program is a traditional method of increasing the supply of registered nurses. It is unlikely that this approach will be as successful in the future as it has been in the past. In this section our review of existing training programs for registered nurses in the western region is summarized. (A more detailed discussion of these training programs is outlined in the report "The Scope of Existing Training Programs - Category 4 Occupations").

There are three types of training programs for registered nurses:

- Basic training - or entry-level training;
- Refresher training; and
- Upgrading
  - related occupation to R.N.
  - Diploma R.N. to Degree R.N.

Exhibit 3, opposite, shows the anticipated or planned output of graduates from these three types of programs in each province in 1981. This level of output is expected to remain relatively constant over the next 5 years in British Columbia, Alberta, and Saskatchewan. In Manitoba, the number of entry-level training outputs will increase from 372 in 1981 to 525 in 1982, and will increase to 600 in 1983 and remain at this level to the year 2000.

Basic Training

Basic training (or entry-level training) is provided at three settings with lengths of programs ranging from a minimum of two years to a maximum of four years. The total enrollment quotas have remained relatively stable over the last decade. The number of applicants to these programs has remained relatively stable, with a slight decrease in the last five years. A study undertaken by the Alberta Hospital Association indicated that the number of applicants to Alberta nursing programs decreased from approximately 3,000 applicants in 1975/76 to approximately 2,000 applicants in 1979/80. The number of students accepted into the registered nurse entry-level programs has decreased somewhat and, in some cases, enrollment quotas have not been filled due to the lack of qualified applicants. In Saskatchewan, the diploma R. N. program enrollment quota at Wascana Institute is 150, however in 1978/79 only 110 students were accepted into the program and in 1979/80 and 1980/81, 139 students were accepted. The trend in declining enrollments has apparently been reversed in Manitoba in the last two years. The most recent experience (1981/82 enrollments) indicates that, on the whole, western Canada is not currently facing a problem in attracting qualified applicants into registered nurse basic training programs. The number of graduates out of these programs was approximately 20% to 25% less than enrollment figures in recent years, with attrition rates varying among each setting (hospital-based versus community college or university-based programs) and among individual educational institutions. This level of attrition, however, appears to be declining.

Upgrading

Upgrading is provided for nursing assistants or psychiatric nurses who wish to become registered nurses. As indicated in the Exhibit 3, Saskatchewan offers a bridging program for nursing assistants to become registered nurses. The number of people in this program was not obtained. There are also upgrading programs for diploma registered nurses who wish to obtain a baccalaureate degree in nursing. The demand for upgrading to degree programs would be significantly greater if the entry-to-practice requirement for registered nurses were a baccalaureate degree. Both the Alberta and Manitoba Associations for Registered Nurses have supported a motion of entry-to-practice at the baccalaureate degree level by the year 2000, but no changes have been made in the legislation to effect this resolution.

It should be noted that there is a projected shortage of nursing assistants and psychiatric nurses and any significant increase in the size or number of upgrading programs to a registered nurse level could increase the size of the projected shortages in these nursing occupations.

Refresher

Refresher training is provided at various settings with program lengths ranging from 10 weeks to 25 weeks. The number of applicants to these programs has increased, and almost all applicants are accepted. Based on the limited data reviewed, it appears that a high percentage of refresher students successfully complete this training.

The future demand for refresher training is in part influenced by re-registration criteria adopted by provincial registered nurses associations. In Manitoba, for example, in order to qualify for renewal of registration as an active practising member a person must:

a) have practised as a registered nurse for a total of at least 60 working days in the 3 year period immediately preceding the registration year of the association for which a renewal of registration is sought; or

b) have practised as a registered nurse for a total of at least 50 working days in the 3 year period immediately preceding the registration year of the association for which a renewal of registration is sought and successfully completed in the same period a continuing education course approved as such by a resolution of the board; or

c) have practised as a registered nurse for a total of at least 50 working days in the 3 year period immediately preceding the registration year of the association for which a renewal of registration is sought and successfully completed in the same period

an educational course which, on application, the board approves as qualifying such person for registration; or

d) have successfully completed within a 2 year period immediately preceding the registration year of the association for which a renewal is sought a refresher program approved as such by resolution of the board. (The Registered Nurses Act, July, 1980)

In Saskatchewan, in order to maintain eligibility for registration a nurse must work at least sixty working days in nursing activities in each five-year period. At least one-half of the sixty days must be worked in hospitals, special care homes, community health programs, educational agencies and/or the professional association. A nurse who has been inactive for five to eight years and who in the past has actively practised nursing for a minimum of three years, shall be re-registered upon recommendation, following twenty days of supervised clinical practice in an accredited hospital, community health agency or Level IV agency which is approved by the Association, under the supervision of a nurse approved by the Association, utilizing Association guidelines for selection of clinical experience and for evaluation of performance. A nurse who has been inactive for over five years and does not meet the above conditions, must take a refresher course approved by the Council (of the Saskatchewan Registered Nurses Association) and be recommended by the course supervisor for re-registration.

In Alberta, a registered nurse who has not practiced 150 hours within the last five years must undertake refresher training prior to being re-registered. In British Columbia, a nurse who has been out of the active workforce for more than 10 years and who has not previously been registered with the British Columbia Association for Registered Nurses must take a refresher course. The Board of Directors of the Association, however, have recently made a committment to introduce new regulations which would reduce the period from 10 years down to a lower level and would make re-registration criteria apply to all registrants, rather than just those from other provinces. It is likely, however, that these criteria will be developed to require "demonstrated competency" as well as or in addition to refresher training per se.

OCCUPATIONAL ISSUES

There are a number of significant occupational issues influencing the present supply and requirement for full-time equivalent nurses in the western region. These issues will have a severe impact on future manpower planning strategies for this occupation. The major occupational issues are set out below with respect to:

- retention of the current supply of active registered nurses;
- recruitment of inactive registered nurses back into the active workforce;
- recruitment of students into training programs for registered nurses; and
- requirement for, and future utilization of, registered nurses.

Retention of Current Supply

The retention issue applies to both retention of the existing supply in the nursing profession and retention of registered nurses in particular employment settings.

The average working life of a nurse is relatively short. Based on a review of the literature and interviews with professional associations, for purposes of this report it is estimated that the average working life of a nurse is between 10 and 12 years. There is no factual information to support this assumption. It has been suggested that the average working life of a nurse may increase in the future for a variety of reasons including social and economic factors, which could be considered uncontrollable elements, and the implementation of retention and recruitment factors, which could be considered controllable elements. The rate of participation of registered nurses in the workforce is believed to be lower than that in other female dominated occupations (such as teaching). Studies conducted elsewhere have indicated that there is not presently a shortage of trained nurses, but rather a shortage of nurses willing to participate in the active workforce as

registered nurses. Again, it would appear that this situation probably also prevails in western Canada, but there is no factual evidence available to quantify the extent of this problem. For a more detailed discussion on average working life and the net occupational shift factor, refer to Appendix B, pages B-4 to B-6.

There is a high turnover rate among registered nurses in institutional settings. The factors affecting the retention of nurses in both the profession and in particular positions or employment sectors fall into four major categories:

- educational factors including:
  - the educational experiences which affect the nurse's job expectations;
  - factors affecting the relationship between education and practice of nursing; and
  - the availability and accessibility of on-going education.
- organizational practices and human resource management factors which affect the nature of nursing jobs, including the opportunity to:
  - employ a full range of skills;
  - undertake whole or meaningful components of patient care;
  - use discretion in work methods;
  - receive adequate feedback;
  - experience professional growth; and
  - realize career mobility.
- employment factors which affect working conditions, including:
  - compensation and benefits
  - scheduling and rotation;
  - transportation;
  - work place amenities, etc.
- social and economic factors including:
  - family responsibilities;
  - mobility of spouses;
  - role of women;
  - interest rates;
  - unemployment rates; and
  - consumer price index.

Employment factors and social and economic factors have thus far been the primary focus of attempts to increase the retention of active nurses in the

workforce. It is now believed, however, that future retention and recruitment strategies should attempt to address the educational and organizational and human resources management factors.

Historical patterns of migration and immigration of registered nurses in western Canada may change in the future. The North American nursing labour pool is relatively mobile and shortages of active registered nurses are projected in other parts of the country. Recruitment or retention strategies developed and implemented in eastern Canada or in the United States may have a more severe impact on the retention of the current or future supply of active registered nurses in western Canada than in the past.

Career choices available to women have significantly expanded in recent years. This could potentially make retention of the current supply of registered nurses more difficult, and could facilitate occupational shifts out of the profession and out of particular employment settings. This may also make recruitment of qualified applicants into registered nurse entry-level training programs more difficult.

Recruitment of Inactive Registered Nurses

It is generally believed that there are a large number of inactive registered nurses who might conceivably be attracted to re-enter the active workforce. The size, age structure or geographic location of this inactive labour pool is unknown. The likelihood of this group returning in significant numbers on a full-time or part-time basis is unknown. Recent experience with refresher programs in western Canada indicates that re-entry to the active workforce by registered nurses is on a part-time basis. (However, in Manitoba it is estimated that 90% of refresher level training outputs return to the workforce on a full-time basis.) Attempts to recruit large numbers of inactive nurses into the active workforce in the United States have not proven as effective as had been hoped. The success of employers in retaining registered nurses who have re-entered the active workforce for extended periods of time has not been sufficiently studied, however, it is believed that the retention rate is poor.

It appears that successful re-entry to the active workforce is somewhat linked to the availability and accessibility of refresher training that allows a registered nurse to gain confidence in her abilities and competence prior to returning to the workforce. Refresher training programs are now more generally available, but there is some concern that these programs are still not readily accessible to inactive nurses who have family responsibilities during the day time.

Recruitment of Students into Training Programs

The attrition rates from nursing education programs, and the experience of some colleges and universities in which enrollment quotas have not been filled in the past due to a lack of qualified applicants, suggests that recruitment into the profession has been a problem. The lack of qualified applicants is viewed as a serious concern in the United States presently, and there are indications that this problem is worsening in other parts of Canada. A recent study published by Health and Welfare Canada indicated that there had been a decrease in applicants to basic entry level programs during the past four years. However, the most recent western region experience indicates that recruitment into the profession is not now a problem. We believe, however, that this situation should be carefully monitored and strategies developed to ensure that this does not become a problem in the longer term. Nursing is, for the most part, still regarded as an occupation primarily suitable for women (historically 90% of registered nurses are female) and efforts to attract males into nursing training programs have not been successful.

The image of nursing as a profession may in future impede the recruitment of qualified high school graduates into entry-level training programs. It has been suggested that registered nurses view nursing as a series of episodic jobs rather than as a career. This image of the profession may make it less appealing to career-oriented young women in the future and may also reduce the likelihood of recruiting males into the profession.

Changing the entry-to-practice level from an R.N. diploma to a baccalaureate degree by the year 2000 has been recommended by the Alberta and Manitoba Associations for Registered Nurses. No legislative changes have been made to bring about this recommendation.

Requirement for Registered Nurses

The requirement for registered nurses may be significantly greater than anticipated if there is an under-supply in other types of nursing personnel (including nursing assistants, nursing aides, psychiatric nurses, etc.)

Another significant factor which would influence the number of full-time equivalent nurses required would be a decrease in the number of hours worked by each part-time worker or a percentage increase in the number of registered nurses working part-time. It has been suggested that many part-time workers would prefer to work fewer shifts, and as salaries increase and the general economy improves there may be a trend towards working less hours per week. On the other hand, if the general economy does not improve and if working conditions improve to facilitate greater participation of working mothers in the full-time workforce, there may be a trend towards increasing the number of hours worked per week. Recent studies in California have indicated that 41% of registered nurses in California work part-time, and that it is possible that there may never again be large staffs of full-time registered nurses in hospitals.

Changes in the manner in which nursing care is provided would impact on the requirement. For example, the introduction of primary nursing would have an impact on the number of nurses required. There is some suggestion that the introduction of primary nursing would significantly change the ratio of registered nurses to nursing assistants in the future. However, the likelihood of a significant movement to primary nursing and the magnitude of the impact this change would have on the projected net requirements identified in this report are unknown.

The further development of nursing specialist positions (intensive care, pediatric, gerontology, etc.) would also affect the requirement for certain types or levels of registered nurses. The scope of this study precluded a detailed assessment of the current and potential future requirements for speciality nursing positions. Therefore, we have not addreased the level of

requirement for specialist nurses, the timing of the requirement, or the most appropriate means of providing training for specialist nursing professionals. There is, however, a need to research the extent to which these and other changes in the provision of nursing care in future would impact on the requirement for registered nurses in western Canada.

There have been in the past, and will likely be in the future, rural and urban differences, north and south differences and seasonal variations in the availability and shortage of active registered nurses. Vacancy surveys and surveys of difficult-to-fill positions have documented the problems experienced in western Canada in this regard. In this study, we assessed the general requirement for registered nurses in western Canada based on present levels of practice. It is recognized, however, that there is a need to develop mechanisms whereby the geographic and seasonal variations in shortages and availability of active registered nurses could be closely monitored.

Generally there is little factual information available on which to assess the longer-term requirement for registered nurses, and even in the shorter term it is difficult to develop accurate projections with a high degree of confidence. The knowledge and skill base requirements of registered nurses has significantly changed over the last decade and there are emerging changes within the nursing profession which will impact on future levels of requirement. There is little quantitative information available on which to assess how changes in nursing practice, changes in technology, changes in productivity, and changes in the over-all delivery of health care have affected the requirement for registered nurses over the past decade. Unfortunately, this lack of historical data hampers the ability of researchers to conduct a quantitative assessment of how much of an impact any future changes in the nursing occupations will have on projected requirements.

ALTERNATIVE MANPOWER STRATEGIES

The preceding discussion has indicated that there is a projected shortage of active registered nurses in the western region and that there are significant occupational issues affecting the recruitment and retention of registered nurses. In the following sections, three alternative strategies for

addressing this projected shortage are examined:

Strategy A - Increase training outputs to meet projected shortages.

Strategy B - Develop and implement retention and recruitment strategies to reduce the net occupational shift.

Strategy C - Increase training outputs and develop and implement retention and recruitment strategies to reduce the net occupational shift.

Strategy A - Increase Training Outputs

Some of the traditional approaches used to meet projected shortages of manpower requirements are to increase the size or number of training programs, reduce their length, or reduce their attrition rates. Other approaches might include changing the entrance requirements to training programs to facilitate the acceptance of larger numbers of candidates.

There has been concern in the profession in the past with regard to the ability of educational institutions to attract appropriately qualified applicants into entry-level training programs. The most recent experience in western Canada indicates that this is not a current problem, however we believe that this situation should be carefully monitored in future in light of the experience being reported in eastern Canada and in the United States. The opportunity to meet significant projected shortages through large increases in training output may not be realistic over the longer term. It is also questionable whether the expenditure of education dollars for this purpose would be efficient. The skills required by nurses are becoming increasingly complex, and it is unlikely that the length of entry-level training programs could be significantly reduced. Similarly, reducing the entrance requirements to training programs is unlikely to be feasible, particularly in light of the fact that some registered nurse associations believe that the entry to practice level should be a baccalaureate degree.

In developing Strategy A, an increase of approximately one-third over the planned level of entry-level outputs was selected as being a reasonable target to be achieved in the long-term. A western region increase of training outputs by one-third assumes that:

1. The present attrition rate of students out of training programs could be reduced.

2. Programs could be made attractive enough to qualified applicants so that there would be an increase in applications and an increase in the number of students accepted into existing training programs.

3. Existing training programs could be expanded in the Fall of 1982 to accommodate a moderate increase in students or that new programs, if required, could be set-up in Fall 1982.

Short and longer term strategies to reduce attrition, to increase applications by qualified applicants and to eventually effect an increase in training outputs would need to be developed and implemented in order to achieve this approach. Issues to be addressed prior to implementing this strategy would include:

- improving the image of nursing as a profession;
- developing and maintaining appropriate entrance requirements into nursing education programs;
- attracting both men and women into the profession;
- providing appropriate support/guidance to nursing students to ensure that studeuts with demonstrated ability and skill remain in the programs until graduation;
- examining the factors affecting the relationship between education and the practice of nursing; and
- examining the educational experiences which affect the nurse's job expectations.

The entry-level output for each province is based on anticipated outputs from hospital-based, community college and university programs as set out in Exhibit 3 of this report, opposite page III-1. No change to refresher level output or upgrading output was considered for this strategy although it is recognized that these program outputs could, if desired, also be increased. The entry-level output in 1981 is based on the information contained in the Training Programs for Registered Nurses report issued earlier in this study, and amended to reflect updated information provided by the Provinces of Manitoba and Saskatchewan. A summary of this information is set out in Table 3 below.

TABLE 3

PLANNED ENTRY-LEVEL ENROLLMENTS AND TRAINING OUTPUT IN THE WESTERN REGION (1981 - 1984)

	Entry-level Enrollments				Entry-level Output			
	1981	1982	1983	1984	1981	1982	1983	1984
British Columbia	916	916	916	916	757	757	757	757
Alberta	855	885	915	915	675	677	691	716
Saskatchewan	430	430	430	430	357	412	412	412
Manitoba	681	681	681	681	372	525	600	600
Western Regional Total	2,882	2,912	2,942	2,942	2,161	2,371	2,460	2,485

Strategy A examined the required number of entry-level outputs in each province in 1984 in order to meet projected shortages in each province. The following increases in 1984 output were used:

	Planned level of Entry-Level Outputs (1984)	Strategy A - Suggested Level of Entry-level Outputs (1984)
British Columbia	757	1,000 (32% increase)
Alberta	716	970 (35% increase)
Saskatchewan	412	535 (30% increase)
Manitoba	600	625 (4% increase)

It should be noted that in the case of Manitoba the percentage increase of only 4% was adopted following updated information received in February 1982. In 1981, Manitoba increased its training inputs to 681 entry-level positions, which given an anticipated attrition rate of 12 per cent, would result in an increased output of approximately 15 per cent in 1983. Therefore, Manitoba addressed the need for increased training outputs prior to the presentation of the final report of this study.

EXHIBIT 4

EFFECT OF IMPLEMENTING STRATEGY A ON THE PROJECTED SUPPLY AND REQUIREMENT FOR F. T. E. REGISTERED NURSES

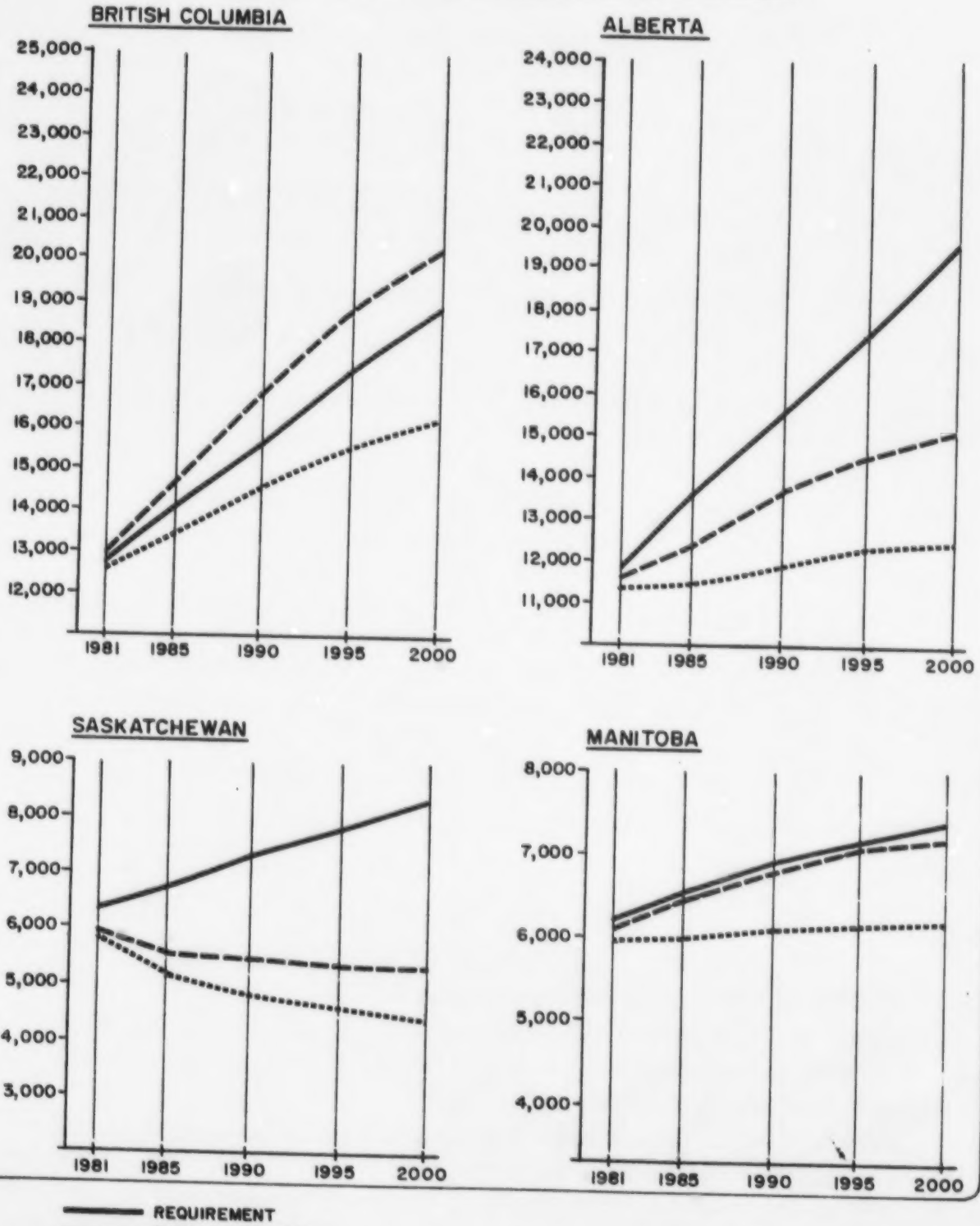


Exhibit 4, opposite, show the effect of increasing training outputs by the percentage amounts indicated throughout the period 1984 to the year 2000.

Table 3 indicates that only small increases in enrollments would be needed to reach the entry-level outputs suggested by Strategy A if attrition out of these training programs could be reduced. If attrition rates were unchanged, however, the number of enrollments would have to be significantly increased. For example, the Province of British Columbia currently has 916 entry-level enrollments and anticipates training outputs of 757 registered nurses. Strategy A suggests that these training outputs be increased to 1,000 in 1984. If attrition could be reduced from 17% to a level of approximately 10%, British Columbia could achieve an increase in training outputs from 757 currently to 833 without increasing enrollments. If attrition rates were unchanged, the number of enrollments would have to be increased from 916 currently to approximately 1,200 to achieve Strategy A.

If the occupational shift is now -8%, Strategy A would be an adequate response for British Columbia and Manitoba and would result in an almost balanced manpower situation. In the case of Saskatchewan or Alberta, Strategy A would be an inadequate response and there would still be manpower shortages. In Saskatchewan, entry-level training outputs would need to be increased by approximately 40% - 45% (576 - 597 entry-level outputs per year). Similarly, in Alberta, entry-level training outputs would need to be increased by approximately 45% - 55% (1,038 - 1,109 entry-level outputs per year). This greatly increased level of training outputs, according to the computer analysis, would result in a balanced manpower situation for Saskatchewan and Alberta.

A significant concern in this approach, however, is that Saskatchewan experiences negative migration and negative immigration of registered nurses out of the province and thus implementing Strategy A may not necessarily achieve a balanced manpower situation. In the case of Alberta, it is somewhat questionable whether such a large increase in training output could be achieved in the short-term and if Strategy A could not be implemented entirely in Fall 1982, the province would need to continually increase its training enrollment figures to phase in this strategy.

If the occupational shift is now -10%, Strategy A would be inadequate for all four provinces and would still result in manpower shortages of the following magnitude over the next five years:

	British Columbia	Alberta	Saskatchewan	Manitoba
1981	200	500	400	300
1982	400	1100	800	400
1983	600	1600	1200	400
1984	700	1900	1400	500
1985	700	2200	1600	500

NOTE: All numbers have been rounded to the nearest hundred.

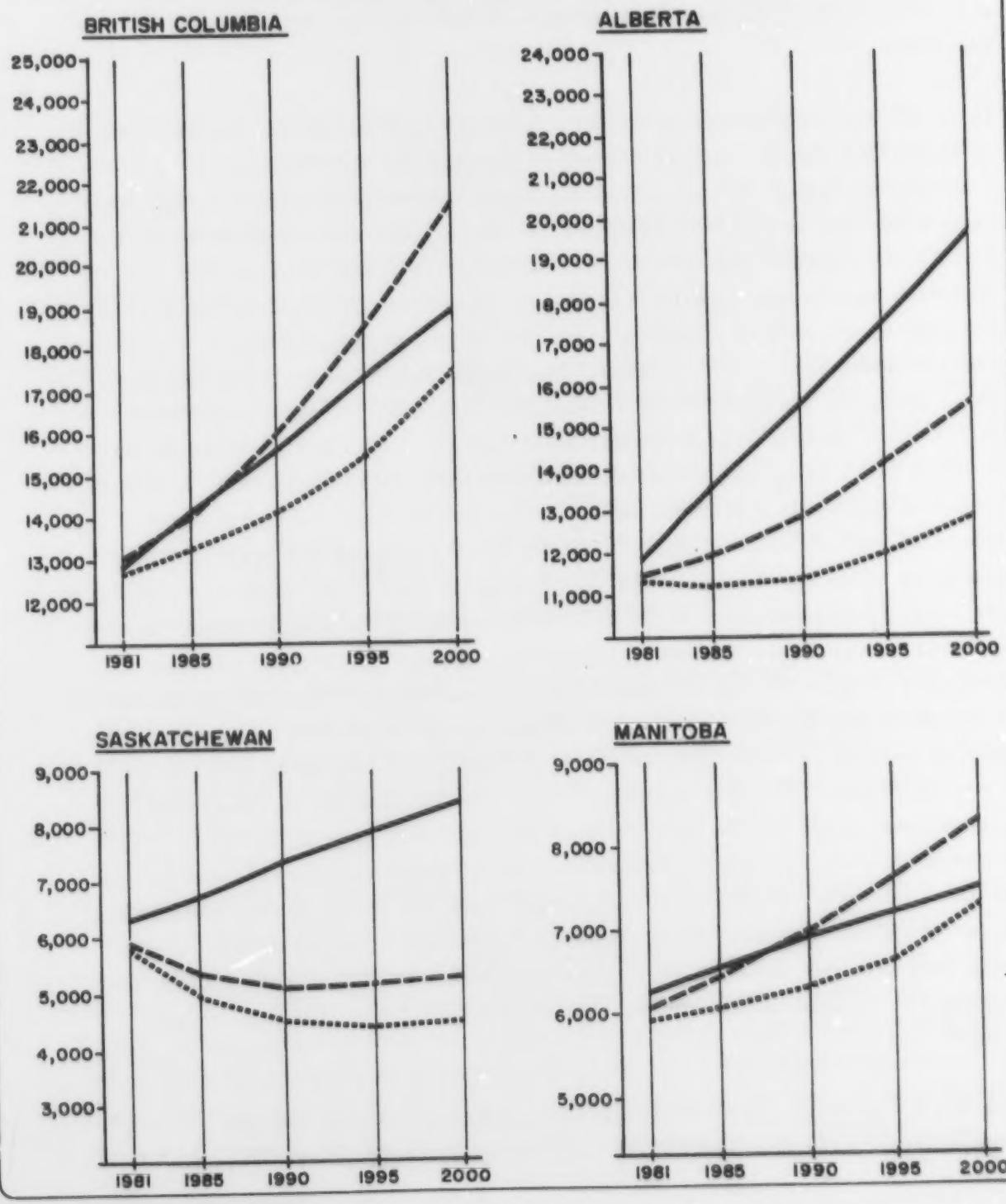
In summary, it would appear that this traditional approach to manpower planning would be an inadequate response for the Western Region. It would help to reduce the projected shortage, but it would still not meet the requirement for registered nurses in each province in the period 1981 -1985 if the assumptions with respect to the net occupational shift of -8% and -10% are correct. A strategy based on greatly increasing training outputs, without addressing the problems of retention and recruitment facing this profession, would be an inefficient and ineffective manpower response to the projected shortage.

Strategy B - Retention and Recruitment

Recent efforts in manpower planning for this occupation in other regions have been directed towards the development and implementation of retention and recruitment strategies. Most of these efforts have centered on addressing employment, and social and economic factors through such measures as increasing salaries, improving benefit packages, offering child day care centers, varying nurse scheduling approaches, etc. Some aggressive recruitment strategies have been designed to attract active registered nurses from other provinces or other countries to a particular employment setting or geographic location. Other strategies have been designed to attract inactive registered nurses back into the workforce. The effect of these types of retention and recruitment strategies has not been studied sufficiently to

EXHIBIT 5

EFFECT OF IMPLEMENTING STRATEGY B ON THE PROJECTED SUPPLY AND REQUIREMENT FOR F. T. E. REGISTERED NURSES



determine their effectiveness or efficiency. Recent studies in the United States, however, suggest that short-term strategies concentrating on employment, and social and economic factors have not been particularly successful.

It is now believed that manpower strategies for this occupation should focus on addressing the educational and organizational practice factors (as discussed on page III-4) affecting retention and recruitment. The educational factors include an examination of how the educational experience affects the nurse's job expectations, the factors affecting the relationship between education and the practice of nursing and the availability and accessibility of on-going educational opportunities. The organizational practices and human resource management factors include those which affect the nature of nursing jobs, including the opportunity to employ a full range of skills, experience professional growth, realize career mobility, etc. This study precluded an in-depth analysis of the retention and recruitment issues impacting on the projected supply of registered nurses in western Canada, however it is generally believed that an examination of the educational and organizational practices affecting retention and recruitment is required. These factors are the least recognized, most difficult and potentially the most fruitful factors to be addressed from a manpower planning standpoint. Both short-term and long-term targets need to be developed. For example, a reasonable target for the western region could be that registered nurses would have an average working life of 15 - 20 years and would stay in each employment setting for 3 years or longer. It would appear that it would be possible to reduce the net occupational shift factor from its present high level down to a more acceptable level, and that this could be accomplished over an extended period of time. However, it should be noted that there may be an irreducible minimum below which turnover and attrition cannot be reduced. The objective of this long-term strategy would be to eventually somewhat stabilize this factor, and reduce the cyclical periods of surplus or shortages in active registered nurses.

Exhibit 5, opposite, shows the impact of gradually reducing the net occupational shift from -8% to -5% over the next twenty years. This would

have the effect of increasing the average working life from 12 years to 20 years over this period. Scenario II shows the effect of reducing the net occupational shift from -10% to -6% (or increasing the average working life from 10 years to 15 years) over the same period.

The assumption implicit in this approach is that both short and long term retention and recruitment strategies would be developed and implemented by the western region which would bring about this change. It may be possible to effect change more rapidly, but on balance it is believed that the targets shown in Strategy B are reasonable given the extent of the occupational issues now facing the profession.

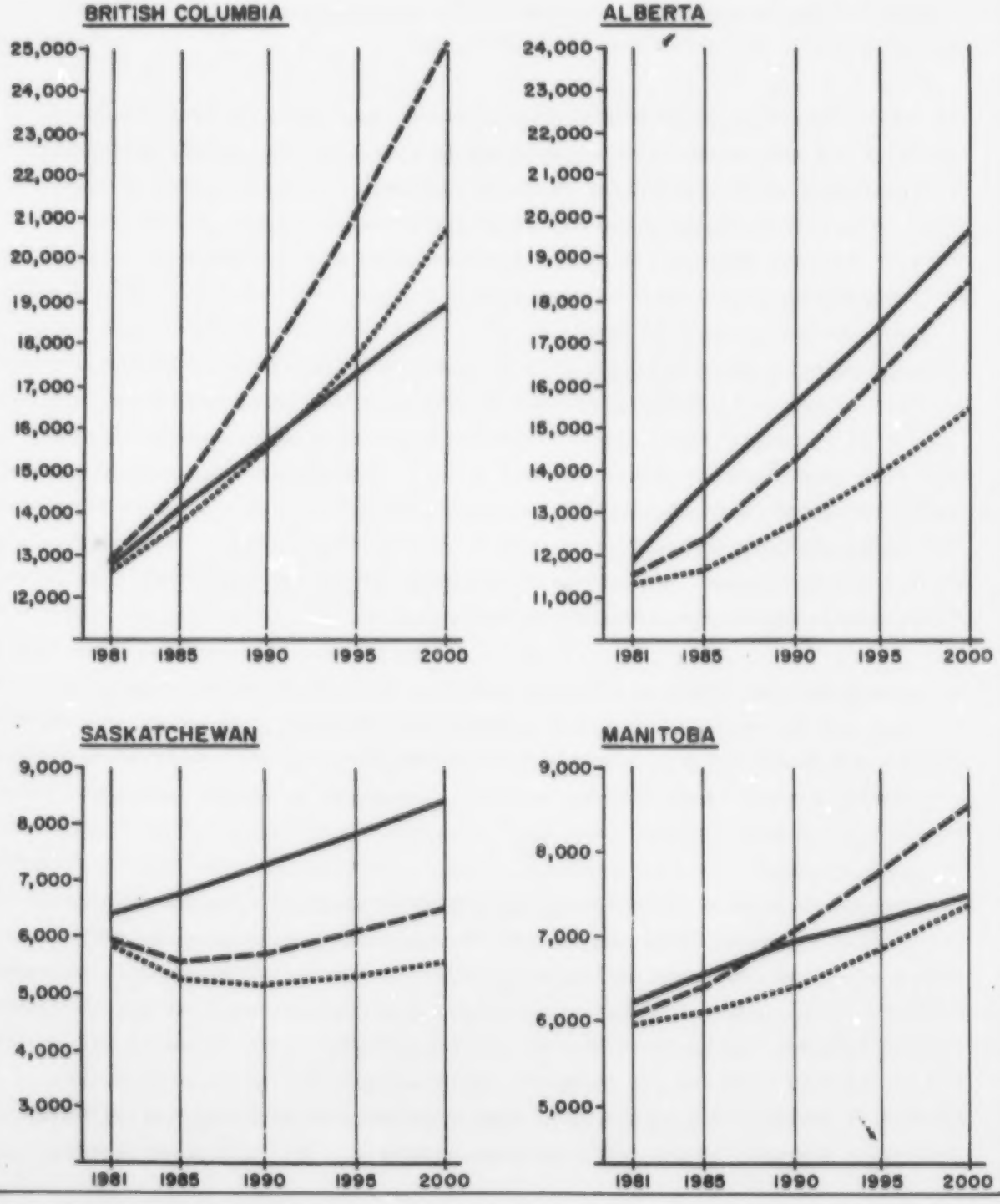
If the occupational shift is now -8%, as shown in Exhibit 5, this strategy would be adequate for British Columbia and Manitoba and could result in a 10% surplus of registered nurses by the year 2000 (assuming that training outputs were held at planned levels). Strategy B would be inadequate for Alberta or Saskatchewan and there would still be significant manpower shortages in these provinces. This strategy, however, would reduce these shortages to levels which would be somewhat more acceptable for Alberta, but it would not significantly reduce the shortages in Saskatchewan.

If the occupational shift is now -10%, Strategy B would be an inadequate response for the western region and would result in manpower shortages in Alberta and Saskatchewan. Strategy B would meet the manpower requirements in both Manitoba and British Columbia and would result in an almost balanced manpower situation.

In summary, Strategy B would reduce the projected shortage of registered nurses over the short and longer term. For the western region, it would reduce projected shortages of 13,000 to 22,000 in the year 2000, down to a 4,000 to 12,000 range. This strategy would be an adequate response for British Columbia and Manitoba whether the occupational shift is now at -8% or -10%. Strategy B on its own, however, would not meet the manpower needs of Alberta or Saskatchewan in the short term. On balance, Strategy B would be an inadequate response to the projected nursing shortage in the western region,

EXHIBIT 6

EFFECT OF IMPLEMENTING STRATEGY C ON THE PROJECTED SUPPLY AND REQUIREMENT FOR F. T. E. REGISTERED NURSES



although it significantly helps to reduce the projected shortage over the longer term. As indicated previously, we believe that there may be an opportunity to more quickly reduce the net occupational shift factor than indicated in Strategy B and this type of strategy could significantly reduce the projected requirements.

Strategy C - Increase Training Outputs and
Develop Retention and Recruitment Strategies

Strategy C consists of a combination of Strategies A and B. Exhibit 6, opposite, shows the effect of increasing entry-level training outputs by approximately one-third and reducing the net occupational shift from -8% to -5% (Scenario I) or from -10% to -6% (Scenario II).

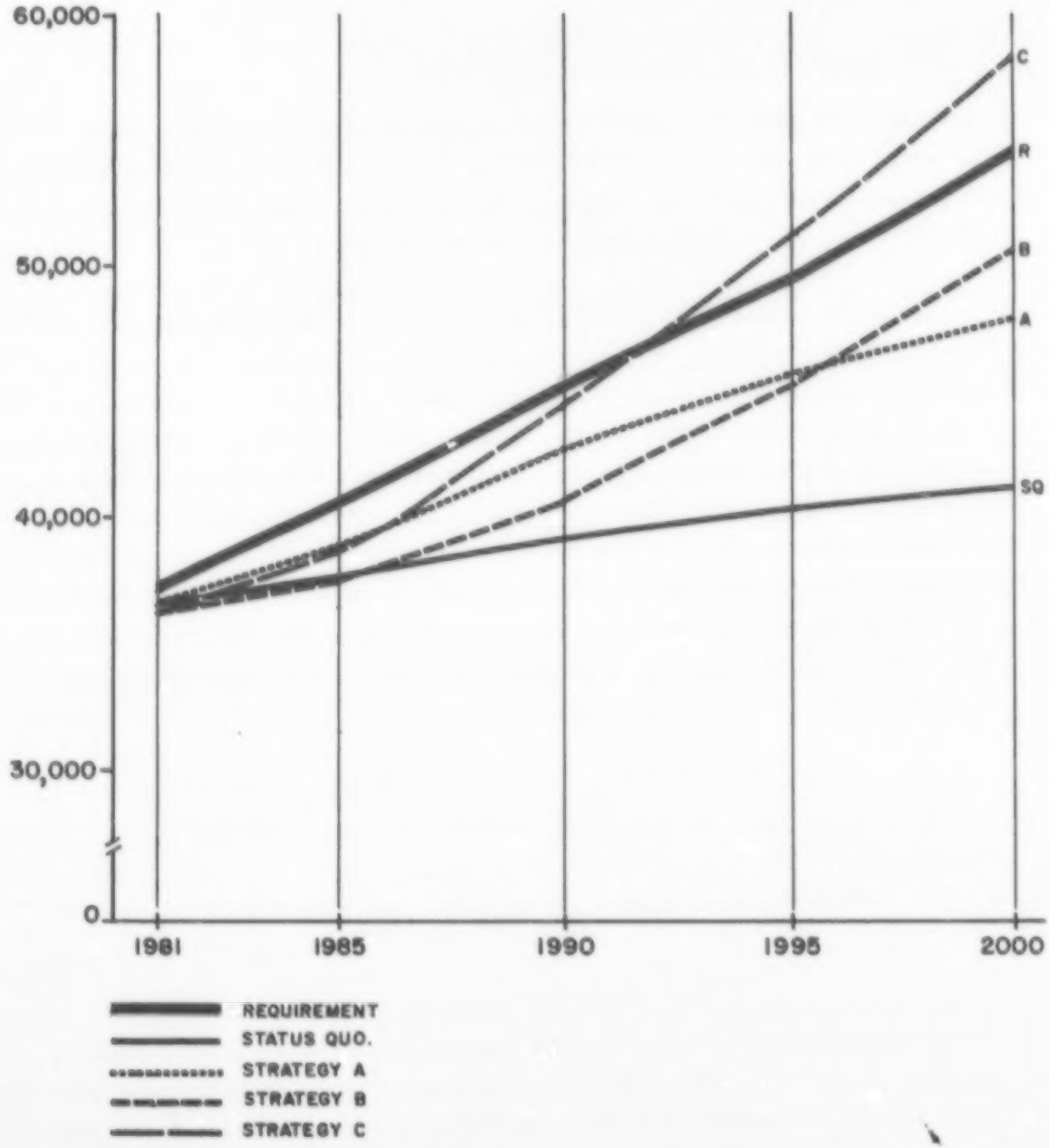
The rationale behind this manpower strategy is that the projected increase in requirement for registered nurses necessitates approaches which would more rapidly bring about a balanced manpower situation. Prolonged shortages of registered nurses would not likely be tolerable in any of the provinces and it is believed that shortages in employment settings contribute to greater shortages in the longer term. Shortages in the 1981-1985 timeframe could, therefore, adversely affect any attempts at recruitment into the profession or retention of existing supply, and could also increase the requirement for other types of nursing personnel (such as nursing assistants, nursing aides, etc.) which are already facing manpower shortages. The priorities in Strategy C should be as follows:

1. Retention of existing supply of active registered nurses.
2. Recruitment of qualified students into entry-level training programs.
3. Recruitment of inactive registered nurses back into the active workforce and their subsequent retention.

If the occupational shift is now -8%, Strategy C would result in a surplus of registered nurses in British Columbia and an almost balanced situation in Manitoba in the 1981-1985 timeframe. Strategy C would be inadequate for Saskatchewan or Alberta, and these provinces would need either to increase

EXHIBIT 7

EFFECT OF VARIOUS ALTERNATIVE STRATEGIES ON THE PROJECTED SUPPLY AND REQUIREMENT FOR F. T. E. REGISTERED NURSES IN THE WESTERN REGION



training outputs by a larger percentage or to achieve a more rapid reduction in net occupational shift. In the case of Saskatchewan, there is also a need to develop and implement strategies to curb the flow of registered nurses migrating out of the province. This might allow Saskatchewan to reduce its projected shortage and to increase the effectiveness of retention and recruitment generally. In the case of Alberta, consideration might be given to increasing the full-time equivalent outputs from refresher training rather than increasing entry-level training outputs above the one-third level. All refresher training outputs in Alberta were calculated to represent 0.4 full-time equivalents. If more of these registered nurses worked on a full-time basis, the projected shortage could be reduced.

If the net occupational shift is now -10%, Strategy C would be adequate for British Columbia and could result in only minor shortages of registered nurses over the short term and projected surpluses over the longer term. There would be only minor shortages for Manitoba and this strategy could be considered adequate. Strategy C would be inadequate for Saskatchewan or Alberta.

Summary

In this section, the present and alternative future manpower strategies were examined in order to address the projected shortage of registered nurses in western Canada. Exhibit 7, opposite, shows the effect of each of the alternative strategies on the projected supply of full-time equivalent registered nurses in the western region from 1981 to 2000 using the -8% net occupational shift (Scenario I). Alternative strategies would have the following effect on net requirements for the western region:

TABLE 4
NET REQUIREMENT FOR F.T.E. REGISTERED NURSES IN WESTERN CANADA
UNDER ALTERNATIVE STRATEGIES

	Status Quo		Strategy A		Strategy B		Strategy C	
	Scenario I	Scenario II	Scenario I	Scenario II	Scenario I	Scenario II	Scenario I	Scenario II
1981	700	1,400	700	1,400	700	1,400	700	1,400
1982	1,300	2,700	1,300	2,700	1,500	2,700	1,500	2,700
1983	1,900	3,900	1,900	3,900	2,300	3,900	2,300	3,900
1984	2,600	5,100	1,900	4,500	2,800	4,800	2,100	4,200
1985	3,200	6,300	1,900	5,000	3,200	5,600	2,000	4,400
1990	6,200	11,400	2,500	7,900	4,600	19,100	800	5,500
1995	9,500	16,200	4,100	11,300	4,500	11,500	-1,400	6,100
2000	13,200	21,000	6,500	15,100	3,700	12,400	-4,200	5,500

Note: All numbers have been rounded to the nearest hundred.

The significant occupational issues presently affecting the supply of full-time equivalent registered nurses require that future manpower strategies must focus on increasing the retention and recruitment of registered nurses. A western region approach to this projected shortage should be developed so that future efforts can be closely monitored and evaluated on a co-ordinated basis. It is important to stress that there is a pressing need for the development of a consistent and accurate data base on which to make informed manpower planning decisions, and that the projections of supply contained in this report are highly sensitive to the net occupational shift factor assumptions which could not be validated. Similarly, we do not have a high level of confidence in the projection of requirement contained in this report and we would therefore caution the reader to regard the net requirements as the best possible estimates that could be made in light of the limitations of the existing data base.

IV - RECOMMENDATIONS

Recommendations with respect to manpower strategies to address the current and projected shortage of full-time equivalent registered nurses in the western region are set out below. They are followed by recommendations for each of the four provinces. These recommendations focus on action to be taken during the 1981-1985 timeframe and reflect the significant concerns expressed in this report about the limitations of the data used and the assumptions made to develop the projections of both supply and requirement.

WESTERN REGION RECOMMENDATIONS

There are several approaches to health manpower planning which would best be undertaken by the western region.

Development of a Manpower Planning Data Base

Previous approaches to manpower planning for registered nurses have been done independently by each western province. Manpower planners and respective professional associations in each province collect and analyze data on registered nurses in a different manner, making it difficult to accurately assess historical trends of factors affecting supply. Similarly, the lack of a consistent historical data base on the requirement for nurses limits the ability of manpower planners to make informed decisions on the likely range of future requirements or to assess the effect of various manpower planning strategies implemented.

RECOMMENDATION #1.

The western region should develop an information base for registered nurses to provide consistent, timely and accurate data for manpower planning purposes. Priority attention should be focussed on developing an information base to include:

- uniform definitions of active and inactive registered nurses.

- a methodology for accurately measuring the occupational shift factor including the movement of registered nurses from active to inactive status, movement in and out of the nursing profession, and attrition due to death or retirement.

- a methodology for monitoring and accurately assessing the migration of registered nurses in and out of each province and for monitoring the immigration and emigration of registered nurses.

- uniform definitions of part-time and casual workers and accurate measurements of the average number of hours worked by each of these groups.

- development of other information bases which would assist in validating trends in employment of registered nurses and the range of requirement for registered nurses in the future. This information should include the type and level of nurses required to meet future employment demands, and trends in new employment settings for registered nurses.

Alternative Manpower Strategies

Previous approaches to manpower planning for registered nurses have tended to focus on increasing the supply through increased training outputs. Identified in this report are a number of significant occupational issues affecting both recruitment and retention of registered nurses. There is little validated research to indicate which types of recruitment and retention strategies are likely to be successful, nor which are likely to be the most successful over the short and longer term. There is, however, widespread belief that the development and implementation of effective recruitment and retention strategies could have a significant influence on reducing the projected shortage of registered nurses in western Canada.

RECOMMENDATION #2.

The western region should conduct research to assess which types of short and longer term retention and recruitment strategies would likely be the most successful in increasing the supply of active registered nurses. This research should include the identification of controllable and uncontrollable factors which impact on retention and recruitment.

Education and health manpower planners in all four provinces should be consulted, and input should be sought from the respective registered nurses associations and from nursing employers.

Research into alternative manpower strategies should focus on the educational and organizational practice factors affecting recruitment and retention of registered nurses.

Review of the Education of Registered Nurses

The education process clearly has a considerable impact on the supply of registered nurses. While the most recent experience indicates that the western region is not currently facing a problem in recruiting qualified applicants into programs for entry-level training as registered nurses, there is a need to carefully monitor this situation in future. Attrition rates also suggest that these programs, or the qualifications of the students accepted into them, are not an appropriate match. Employers have found it difficult to retain graduates in the active workforce. The high rate of occupational shift out of the nursing profession suggests that there may be conflicts between the educational experience and expectations of a registered nurse and actual experiences in the job setting.

In addition to these entry-level training concerns which will have a serious impact on future manpower strategies, there is some concern about the availability and accessibility of continuing educational opportunities for active registered nurses who are currently employed. This study has focussed on the more general requirement for registered nurses. The projected supply and requirement for certain types and levels of specialist nurses requires study and should address the appropriate type, length, and setting for these educational programs.

It has been suggested in this report that successful recruitment of inactive registered nurses back into the active workforce is somewhat linked to the availability and accessibility of refresher training programs. There is a

need to study the most appropriate means of accomplishing this type of education, and to assess the efficiency and effectiveness of present refresher level programs in increasing the supply of full-time equivalent active registered nurses.

RECOMMENDATION #3.

Research should be undertaken to examine the current educational programs for this occupation. This research should include:

- an examination of the entrance requirements to training programs, the accessibility of these programs to all qualified candidates, and the prospective student selection process;
- an examination of the factors affecting the relationship between education and the practice of nursing in both institutional and community settings, and the educational experiences which affect a nurse's job expectations;
- an examination of the support or guidance resources within an educational setting and the extent to which these resources contribute to reducing the attrition out of nursing programs; and
- an examination of how the educational process affects the image of the nursing profession generally.

Co-ordination of Health Manpower Strategies

One of the factors influencing the supply of registered nurses in the four western provinces is migration between the provinces, as well as migration in or out to other provinces in Canada. The assessment of future supply in western Canada in this report assumed that historical patterns of migration would continue over the next twenty years. It would appear that co-ordination of health manpower strategies, including recruitment and retention incentives, in the western region could prove beneficial. It has been suggested in this report that the nursing labour pool is relatively mobile and there are projected shortages of registered nurses in other parts of North America. It is likely that the western region may, in future, have to compete vigorously to retain its current and future supply of registered nurses.

RECOMMENDATION #4.

The western region, through a new interprovincial committee, should coordinate health manpower planning efforts to recruit and retain registered nurses.

Consideration should be given to coordinating the following:

- development of specialized training programs to meet the western region's need for management-level registered nurses, as well as nursing specialists.

- compensation and benefits packages for both full-time and part-time registered nurses, as well as any other financial incentives which may be considered to reduce shortages in particular geographic locations.

- sharing information and results of pilot retention and recruitment strategies undertaken in each province and the development of long-term research projects to assess the impact of these strategies.

PROVINCIAL RECOMMENDATIONS

On the basis of current statistical data concerning the supply and requirement for registered nurses in the four western provinces as well as consideration of the numerous factors which affect the supply and demand for nurses, it would appear that there is a significant requirement for additional nurses both in the immediate and long-term future. Three alternative strategies for addressing these shortages were described and discussed in previous sections of this report. On the basis of this assessment, specific recommendations were developed for each province.

In developing these specific provincial recommendations, the following key factors have been considered:

- the data base and key assumptions on which the current and future supply and demand for registered nurses is projected has many weaknesses, although it is the best information currently available;
- there are many occupational factors which impact on the supply and demand for nursing staff which cannot be accurately measured or projected in the future;
- historically, there have been periods of acute shortages followed by acute surpluses of nurses in Canada;
- it is doubtful that merely increasing training programs will solve all of the problems associated with nursing requirements;
- there is a need to develop a plan which allows for the gradual increase in training programs on a phased basis over several years;
- the plan should permit each province to modify its training program enrollments on an annual basis to reflect updated supply and demand projections;
- there are many other factors such as labour market forces, hospital construction projects, governmental health policies, economic conditions, productivity changes, technological innovations, as well as geographic distribution problems which impact on the requirement for registered nurses;
- the practicality of a province being able to adjust its training programs in the short term (1-2 years) must be considered.

On the basis of these key factors, as well as extensive discussions with the project Steering Committee, we have developed the following recommendations for registered nurses for each province.

BRITISH COLUMBIA

British Columbia will experience only minor shortages of full-time equivalent registered nurses over the period 1981-1985 if the net occupational shift is currently -10%, or it will have a minor surplus if the net occupational shift is -8%. It would appear that British Columbia is in a good position to direct its efforts towards the development and implementation of retention and recruitment strategies and to maintain its existing number of entry-level training outputs from 1981-1985. Consequently, our recommendations are based on the rationale as contained in Strategy B in this report.

RECOMMENDATION #5.

The Province of British Columbia should improve its collection and analysis of data on both active and inactive registered nurses so that informed decisions may be made in future years on the requirement for and the supply of registered nurses in the Province.

RECOMMENDATION #6.

The Province of British Columbia should design and pilot test retention and recruitment strategies as a first priority and, based on the results of this research, develop and implement retention and recruitment strategies as soon as possible.

RECOMMENDATION #7.

The Province of British Columbia should make efforts to increase the number of entry-level training outputs, through reducing the current attrition rates of these programs.

RECOMMENDATION #8.

The Province of British Columbia should carefully monitor the success of retention or recruitment strategies and the supply and requirement for registered nurses in order to be able to make any changes required in training program sizes in 1985 or sooner.

ALBERTA

Alberta is facing an immediate and longer-term shortage of registered nurses according to the projections contained in this report. A dramatic growth in population and the planned construction of many new hospital beds over the next twenty years will result in a sharp increase in demand for registered nurses as well as for other nursing personnel. It may not be possible to secure large numbers of registered nurses from other parts of Canada or from outside Canada because of projected shortages elsewhere. The Province of Alberta has embarked on an extensive refresher training program to recruit inactive nurses back into the workforce. The potential longer term success of this type of effort is unknown; however, the majority of those who have recently completed the program appear to have returned to the workforce on a part-time basis only. If Alberta could increase the percentage of those returning on a full-time basis after completing these refresher programs, it would help to reduce the projected shortage in the short term. It is believed that both an increase in entry-level training output as well as the development and implementation of retention and recruitment strategies will be required in Alberta. The projections contained in this report indicate that the successful implementation of retention and recruitment strategies alone, may not meet the projected requirements. Therefore, our recommendations address the need for increased training as well. Alberta would need to increase training outputs by 45%-55% to meet the requirements projected in this report. However, the lack of a validated database, as well as the significance of this increase in numbers of outputs, has resulted in a recommendation of increased training outputs below the level needed to meet the projected requirements in this report. Our recommendations reflect the rationale used in Strategy C.

RECOMMENDATION #9.

The Province of Alberta should improve its collection and analysis of data on both active and inactive registered nurses so that informed decisions may be made in future years on the requirement for and supply of registered nurses in the Province.

RECOMMENDATION #10.

The Province of Alberta should design and pilot test retention and recruitment strategies as a first priority and, based on the results of this research, develop and implement retention and recruitment strategies as soon as possible.

RECOMMENDATION #11.

The Province of Alberta should increase the number of entry-level training outputs by the maximum amount possible in 1982 and should attempt to increase the size and/or number of its training programs to allow for an increase in trained graduates by approximately 20%-30% above planned levels in the longer term.

RECOMMENDATION #12.

The Province of Alberta should carefully monitor the success of retention or recruitment strategies and the supply and requirement for registered nurses in order to make any other changes in training program size in 1985 or sooner.

SASKATCHEWAN

According to the projections contained in this report, the Province of Saskatchewan is currently facing a shortage of full-time equivalent nurses, and this shortage is projected to grow over the next twenty years. A serious concern in Saskatchewan is that the effect of increased training outputs is diminished by migration of registered nurses out of the province. Both short and longer-term strategies are required to address this projected shortage. Saskatchewan has a low level of refresher training outputs and it is estimated that only 25% of these refresher outputs return to work on a full-time basis. If the number of refresher outputs could be increased and if a larger proportion returned to the work force on a full-time basis, it could significantly increase the projected supply. There is also a need to increase the number of entry-level training outputs, as well as to develop and implement retention and recruitment strategies to increase the supply of active registered nurses in Saskatchewan. The projections contained in this report indicate that the successful implementation of retention and recruitment strategies alone, may not meet the projected requirements. Therefore, our recommendations address the need for increased training as well. Although Saskatchewan would need to increase training outputs by 40%-45% above planned levels to meet the projected requirements identified in this report, the lack of a validated data base, as well as the significance of this increase in numbers of outputs and associated costs, has resulted in a recommendation of increased training outputs below the level needed to meet the projected requirements of this report. Our recommendations are based on the rationale contained in Strategy C. However, it is recognized that due to the large out migration of registered nurses, this strategy alone will not meet the net requirements projected in this report. This suggests the need for careful monitoring of this factor which significantly impacts on manpower planning.

RECOMMENDATION #13.

The Province of Saskatchewan should improve its collection and analysis of data on both active and inactive registered nurses so that informed decisions may be made in future years on both the requirement for and the supply of registered nurses in the Province.

RECOMMENDATION #14.

The Province of Saskatchewan should design and pilot test retention and recruitment strategies as a first priority and, based on the results of this research, develop and implement retention and recruitment strategies as soon as possible.

RECOMMENDATION #15.

The Province of Saskatchewan should increase the number of training outputs by the maximum possible in 1982 and should attempt to increase the size and/or number of training programs to allow for an increase in trained graduates by approximately 20%-25% above planned levels in the longer term.

RECOMMENDATION #16.

The Province of Saskatchewan should carefully monitor the success of retention or recruitment strategies and the supply and requirement for registered nurses in order to make any other changes in training program size in 1985 or sooner.

MANITOBA

The Province of Manitoba, according to the projections contained in this report, is currently facing a minor shortage of full-time equivalent registered nurses, and this shortage is projected to increase over the next 20 years. The projections in this report are based on 90% of refresher outputs re-entering the work force on a full-time basis. If this assumption does not continue in the longer term, it could significantly affect the net requirements identified in this report. Both short and long term strategies are required to address the projected shortages contained in this report. Manitoba already plans to gradually increase the number of entry-level training outputs. In addition, however there is a need to develop and implement retention and recruitment strategies to increase the supply of active registered nurses in Manitoba. Our recommendations, therefore, are based on the rationale contained in Strategy B.

RECOMMENDATION #17.

The Province of Manitoba should improve its collection and analysis of data on both active and inactive registered nurses so that informed decisions may be made in future years on the requirement for and the supply of registered nurses in the Province.

RECOMMENDATION #18.

The Province of Manitoba should design and pilot test retention and recruitment strategies as a first priority and, based on the results of this research, develop and implement retention and recruitment strategies as soon as possible.

RECOMMENDATION #19.

The Province of Manitoba should maintain the planned number of entry level training outputs and should, if possible, attempt to further reduce the attrition levels out of training programs.

RECOMMENDATION #20.

The Province of Manitoba should carefully monitor the success of retention or recruitment strategies and the supply and requirement for registered nurses in order to make any other changes required in training program size in 1985 or sooner.

APPENDIX A

STUDY APPROACH AND METHODOLOGY

STUDY APPROACH

Introduction

In order to achieve the study objectives, the work program consisted of three key activities. These were:

- the analysis of manpower supply and requirements, and the calculation of net manpower requirements;
- the analysis of existing training programs for Western Canada;
- the development of recommendations for alternative training locations and funding arrangements.

Analysis of Manpower Supply and Requirements

The analysis of manpower supply and requirements was designed to allow for a variety of data inputs, and for different emphasis on the occupation under review. A variety of data sources were used including provincial and national associations, health insurance agencies, and provincial health and education departments. In all instances, data was developed independently of previously published sources.

In addition to the basic projection of net manpower requirements, a number of sensitivity analyses have been completed to assess the impact of changes in the factors affecting supply and requirements, prior to developing recommendations for either additional training programs, or expanding existing training programs.

Approaches to Determining Manpower Requirements

The approach developed to determine manpower requirements used three methods of projection. These are discussed below.

1. Service Utilization Approach

The utilization approach is based on an analysis of the pattern of health service usage. It establishes trends in service utilization and projects these onto future population estimates. There are three steps in the service utilization approach.

Step 1 - Determine Per Capita Utilization Rate

Historical data of the number of services provided, by age and sex of recipient is derived. The number of services per age/sex group is then divided by the population for group in the corresponding year. This results in a per capita utilization rate.

Step 2 - Project Future Service Required

The per capita utilization rate is projected onto the low, medium and high population for each year from 1981 to 2000. This results in an estimate of total future services.

Step 3 - Estimated Number of Practitioners Required

Having determined the total future services, the model projects the number of practitioners required, by assuming a constant level of services per practitioner. The number of services per practitioner is determined by dividing total services by the number of practitioners in the base year. To estimate the number of practitioners, the model divides total future services required by the number of services per practitioner.

2. Service Target Ratio Approach

Service target ratios reflect a theoretical optimal manpower level required to meet health service requirements in the occupation under review. They are expressed as the ratio of practitioner to population. The service target ratios are derived based on discussion with health authorities, review of published reports, articles and summary of defined health care needs.

3. Population Ratio Approach

Population ratios are derived by dividing the total population at a specific point in time by the number of active practitioners. This results in a ratio of practitioners to population.

These ratios are analysed to determine if any trends exists. To project future manpower requirements, the model divides total projected population by the previously determined population ratio.

Summary of Approaches to Projecting Manpower Requirements

The three approaches outlined above have been used for the calculation of manpower requirements for this occupation. The specific application of each approach to this occupation is discussed under General Assumptions, Appendix B, following.

There were four general study reports issued separately to the Steering Committee which provided further information on the overall study methodology and approach. These reports are:

- Report A - Health Manpower Planning Approaches
- Report B - Health Manpower Planning Organization and Activities in Western Canada
- Report C - A Decision Process to Evaluate the Location of, and Funding Arrangements for Health Occupation Training Programs in Western Canada
- Report D - Population

APPENDIX B

PROVINCIAL NET MANPOWER REQUIREMENTS

EXHIBIT B-1

FULL-TIME EQUIVALENT REGISTERED NURSES IN WESTERN CANADA

Year	British Columbia[1]	Alberta[2]	Saskatchewan[3]	Manitoba[4]
1975		9,743	6,441	6,165
1976	12,023	9,826	5,721	6,243
1977	11,309	10,405	5,312	6,504
1978	11,715	11,177	6,169	6,587
1979	12,007	10,864	6,174	6,069
1980	12,579	11,417	6,175	6,114

Notes:
1. Revised R.N. Data Series, Statistics Canada, July 1981.
2. Alberta Association of Registered Nurses (AARN).
3. Saskatchewan Registered Nurses Association (SRNA).
4. Manitoba Association of Registered Nurses (MARN).

GENERAL ASSUMPTIONS

Exhibit B-1, opposite, shows the recent historical trend of full-time equivalent registered nurses in western Canada. These figures reflect the number of full-time equivalent registered nurses who were active in nursing in their respective provinces, as identified by the sources noted at the bottom of the table. Excluded from these figures were those registered nurses categorized as "associates", those working outside of the province, and those identified as students enrolled in upgrading programs from diploma to baccalaureate degree. These figures may inadvertently include those registered nurses in British Columbia who hold dual status as registered nurses and as psychiatric nurses. The basis used for calculating full-time equivalents for each province is shown later in this section.

Where possible, the historical data provided by Associations was compared with the data provided by provincial government sources. Discrepancies were noted in some provinces and for consistency the respective registered nursing associations data base was used as it provided greater detail on other factors required in the analysis. Some of the discrepancies related to different time points in data collection. Other discrepancies related to the inclusion or exclusion of out-of-province registrants, and definition of the terms active, inactive, associate, pre-registrant, etcetera.

The associations provided information on the estimated or actual breakdown between part-time and full-time practitioners for Exhibit 1. In 1980, approximately 60% of all registered nurses worked full-time and 40% worked part-time. Each full-time registered nurse represents 1.0 full-time equivalent. Each part-time registered nurse in British Columbia, Alberta and Saskatchewan was assumed to represent 0.4 full-time equivalent. Each part-time registered nurse in Manitoba was assumed to represent 0.5 full-time equivalent.

The degree of accuracy of the information shown in Exhibit B-1 is unknown. The data bases could not be validated and consequently it is difficult to have a high level of confidence in these numbers.

EXHIBIT B-2

FACTORS AFFECTING MANPOWER SUPPLY
REGISTERED NURSES, WESTERN CANADA

Factor	British Columbia	Alberta	Saskatchewan	Manitoba
Opening Stock	12,579	11,417	6,175	6,114
Net Migration	4.0%	1.5%	-1.5%	-2.0%
Net Immigration	0	-0.4%	-1.0%	0
Net Occupational Shift	-8.0% & -10.0%	-8.0% & -10.0%	-8.0% & -10.0%	-8.0% & -10.0%
Training Output (Entry level F.T.E.)	757	730	412	372 in 1981 525 in 1982 600 in 1983-2000
Training Output (Refresher level F.T.E.)	76	172	26	177 in 1981 159 in 1982 114 in 1983-2000

Supply Assumptions

The general assumptions made with respect to each of the factors which have the potential to affect manpower supply are shown in Exhibit B-2, opposite.

- Opening stock - the number of full-time equivalent registered nurses as calculated in Exhibit 1.

- Net migration - expressed as a percentage of opening stock. It was assumed that the historical trend would continue at a constant rate. There is no information to validate this assumption and a review of historical trends did not reveal why there had been variations in the past. There is inadequate Association data on outflows of registered nurses to other provinces and the percentages shown may be underestimating outflows as only those registered nurses requesting verification of their status are recorded by the Associations.

- Net immigration - expressed as a percentage of opening stock. It was assumed that the historical trend would continue at a constant rate. There is no evidence to support this assumption. Similar to the net migration factor, there is inadequate Association data on outflows and the percentages shown may be underestimating outflows.

- Net occupational shift - expressed as a percentage of opening stock. This factor includes movements from active to inactive, inactive to active, and attrition due to death or retirement. Based on the review of limited Association data, this factor has historically been erratic and has ranged from -3% to -11%. A review of historical trends did not reveal why these erratic changes had occurred. It was assumed that a range of -8% to -10% was the status quo and that this range would be constant over the next twenty year period. There is no valid evidence to support this assumption and this may be understating or overstating supply. It should be

emphasized that the use of -8% and -10% net occupational shift significantly affects the projected net requirements shown in this report, and our confidence in the projected net requirements is limited as we were unable to validate this extemely sensitive assumption. (A further discussion of this factor is contained later in this section.)

- Training outputs (entry-level) - the number of planned entry-level outputs as projected by respective educational authorities in each province in 1981. It was assumed that these outputs would remain as indicated until the year 2000, which may be overestimating outputs if enrollment figures do not meet quota levels. It was assumed that attrition from these programs would remain at the same rate, which may be under or overestimating outputs. Each entry-level output was assumed to equal 1.0 full-time equivalent. There is no evidence to support the assumption that all entry-level outputs join the active work force as full-time participants, but this is believed to be generally true of the majority.

- Training outputs (refresher level) - the number of planned refresher level outputs as projected by respective educational authorities in each province in 1981. It was assumed these outputs would remain as indicated until the year 2000. It was also assumed that all enrollments in British Columbia and Alberta would successfully complete this program and would return to the active workforce on a part-time basis. There is no evidence to support these assumptions. Each refresher level output was assumed to represent 0.4 full-time equivalent in British Columbia and Alberta. In Manitoba, it is estimated that 90% of refresher graduates return to the workforce on a full-time basis and the remaining 10% return as 0.5 full-time equivalents. In Saskatchewan, it is estimated that 75% return on a part-time basis (as 0.4 full-time equivalents) and the remaining 25% return as 1.0 full-time equivalents.

The assumptions made with respect to refresher level training output

may be underestimating or overestimating projected supply as more registered nurses than assumed may re-enter the workforce on either a full-time or part-time basis, while others may not re-enter the workforce after completing refresher training. This assumption may also be overestimating projected supply if anticipated enrollments do not materialize.

SENSITIVITY ANALYSIS

The two most significant assumptions which could not be validated were the number of hours worked by each part-time registered nurse and the net occupational shift factor. In order to test the sensitivity of these assumptions, several analyses were undertaken.

Hours Worked by Part-time Registered Nurses

At present, data is collected annually by respective nursing associations in each province on the number of nurses working full-time and part-time, and an attempt is made to collect information on the number of hours worked by each part-time registered nurse. There is no standardized definition of the term part-time and this category could include those working several hours per year (on a casual basis), as well as those working on a half-time basis each week. Since the information is collected only once annually, it could also include those who were working part-time but are no longer in this category or those who planned to work part-time but did not do so.

The number of hours worked by each part-time registered nurse significantly affects the full-time equivalent calculation. Computerized listings of the range in the number of hours worked by registered nurses in Ontario were examined. This information indicated that part-time registered nurses represented 0.34 full-time equivalents in 1979 and 0.37 in 1980. Saskatchewan reported that in 1979, part-time registered nurses worked an average of 16 hours per week (or 0.426 full-time equivalent). In 1980, part-time registered nurses in Saskatchewan worked 17 hours per week (or 0.453 full-time equivalent). The Alberta Hospital Association in their study Nursing

Manpower in 1980, used 0.42 as an average full-time equivalent value for part-time registered nurses working in active treatment hospitals. There was no information available on the average number of hours worked by part-time registered nurses in British Columbia. Following discussion with the respective nursing associations and institutional employers, we selected 0.4 (for British Columbia, Alberta and Saskatchewan) and 0.5 (for Manitoba) as a reasonable assumption on which to base the calculation of full-time equivalents. This assumption was applied historically to arrive at the number of full-time equivalents in each province from 1975-1980, as shown in Exhibit B-1. It was also assumed that this full-time equivalency factor would remain unchanged from 1981 to the year 2000. There is no evidence to support this key assumption. It is possible, for example, that the breakdown between full-time and part-time registered nurses will fluctuate in future and that the number of hours worked by part-time nurses will increase or decrease in response to a variety of factors. Changes in the full-time equivalency factor would significantly affect the supply projections shown in this report and the number of nurses required to meet the full-time equivalent requirement projections. There was no information available to quantify the extent or magnitude of any trends emerging in this key factor.

Net Occupational Shift Factor

The nursing professions are predominantly female and there has always been a significant amount of movement in and out of the active workforce, as well as movement from the nursing profession to another profession. The net occupational shift factor was developed to assess the extent of this movement and its impact on the present and future supply of registered nurses in western Canada. The net occupational shift factor was defined to include:

- net movement from active to inactive or from inactive to active status;

- net movement into the profession from another profession or movement out of the active nursing profession to another profession; and

- attrition due to death or retirement.

A standard definition of both types of net movement was developed at the outset of the study. In the nursing profession, attrition due to death or retirement was included as part of the net occupational shift factor. This was done because no information was available on the age breakdown of inactive practitioners. Since there is a significant amount of movement in and out of the active workforce, it was believed that retirement of active practitioners as a separate supply factor would lend a degree of accuracy which would be misleading. Exhibits set out later in this Appendix provide the age breakdown of active practitioners.

The net occupational shift factor was also used as an approximation of average working life. There are no working life expectancy tables for registered nurses in Canada, and no similar tables available elsewhere. The sensitivity of the net occupational shift factor on the present and future supply of registered nurses was tested under the following scenarios:

TABLE B-1

Net Occupational Shift Factor and
Average Working Life Approximations

Net Occupational Shift	Average Working Life Approximation
- 5.0%	20 years
- 6.5%	15 years
- 8.0%	12 years
-10.0%	10 years
-12.5%	8 years

Because of the large percentage of part-time participation in the workforce for this occupation, average working life was calculated in terms of full-time equivalents. For example, a registered nurse who works full-time for 3 years has an average working life of 3 years. However if a registered nurse works part-time for 3 years as a 0.4 full-time equivalent, average full-time

equivalent working life would be 1.2 years.

There is little validated information with respect to the net occupational shift of registered nurses. The Saskatchewan Association for Registered Nurses (S.A.R.N.) reported that they believe the average length of stay in the workforce is somewhere between 3 - 10 years, but this has not been verified statistically. S.A.R.N. also reported that out of 800-900 nurses not renewing their registration in one year, it is believed that 200-300 actually leave the workforce. Of these 200-300, approximately 50 return to the workforce within five years. Approximately 45 return to work part-time or casual and 5 work full-time. The Alberta Hospital Association reported occupational losses of registered nurses at 6.2% per annum as an average rate over the last five years. The Manitoba Association for Registered Nurses (M.A.R.N.) reports movement from active to inactive status at 11% - 13% between 1970 - 1980. Movement from inactive to active status between 1975 - 1980 in Manitoba averaged approximately 5% per annum. The net occupational shift in Manitoba historically appears to have ranged from -5% to -8%. A review of two years of data from the British Columbia Health Research Unit indicated that the net occupational shift of registered nurses in that province was approximately 8% per annum in 1979 and 1980.

It was not possible to validate the historical trend in net occupational shift in each province. Analysis of the historical information available inferred that the net occupational shift has been highly erratic over the last five years (1975-1980) and has ranged from -3% to -11%. There is no information available to explain why these erratic changes have occurred. It has been suggested, however, that these changes could have been a direct or indirect response to changes in the labour market conditions, changes in the economy, and/or changes in social or other environmental conditions which influence more/less registered nurses to leave or rejoin the active workforce in any one year. There has been little research conducted to assess the relative weighting of each of these possible linkages and the impact this will have on the net occupational shift in future.

The selection of a single percentage value to reflect the net occupational

EXHIBIT B-3

EFFECT OF VARYING THE NET OCCUPATIONAL SHIFT FACTOR
ON THE NET REQUIREMENT FOR
F.T.E. REGISTERED NURSES IN WESTERN CANADA
IN 1981

Provinces	Net Occupational Shift Factors				
	-12.5%	-10%	-8%	-6.5%	-5%
British Columbia	500	200	-100	-300	-400
Alberta	900	600	300	200	0
Saskatchewan	700	400	300	300	200
Manitoba	500	300	100	0	0
WESTERN REGION TOTAL	2,600	1,500	600	200	-200

NOTE: All numbers have been rounded to the nearest hundred.
A minus sign indicates a surplus.

shift factor over the 1981-2000 timeframe results in supply projections which may be exaggerated in any one year. A number of sensitivity analyses were undertaken to assess the impact of varying this critical assumption. In Exhibit B-3, opposite, we set out the results of the analyses of the net requirement for full-time equivalent registered nurses in western Canada in 1981, varying the net occupational shift factor. There are a large number of occupational issues presently facing registered nurses (as discussed on pages III-3 to III-7), and it was estimated that the net occupational shift presently ranges from -8% to -10%. However, there is no validated evidence to confirm this key assumption. Following discussions with nursing associations and nursing employers, these two scenarios were selected for use in this report.

Some suggestion has been made that the net requirements in 1981 using different net occupational shift assumptions should be compared with actual nursing vacancies reported in each province in 1981. For example, Saskatchewan reported that in June 1981, there were 187 vacant nursing positions in hospitals and that this vacancy rate suggests that the net occupational shift, at that point in time in 1981 was -5%. In Manitoba there were 394 nursing vacancies (including registered nurses, psychiatric nurses and nursing assistants) in September 1981 resulting in a reported vacancy rate of 5.2%. Of these, 287 were full-time positions, 87 were part-time and 20 were casual positions. No data was available to identify how many full-time equivalent registered nurses positions were vacant, however government sources indicated that most of the reported vacancies were registered nurse positions. Similar vacancy information for the period March through August 1981 in Manitoba suggests that the overall nursing vacancy rate ranged from a high of 5.5% in March to a low of 4.9% in June. It should be noted, however, that this vacancy information reflects the responses of 65% - 70% of the sample (162 respondents out of 221 facilities surveyed in August) and that, because of concerns with regard to the accuracy of information, Manitoba has recently developed a new method of gathering vacancy information. Regrettably the results of the October, November, and December 1981 surveys were not available prior to the release of this report. It is difficult to draw any conclusions about the vacancy rate information and relate it to the net occupational shift

shown in Exhibit B-3. It would appear, however, that the net occupational shift in Manitoba in 1981 could have been -8% or even possibly as high as -10% based on a comparison of experienced vacancies and the projected requirements shown in Exhibit B-3, .

We do not believe, however, that it is realistic or reasonable to draw direct parallels between vacancy rate information and the net occupational shift assumptions used to project supply from 1981-2000. The reasons for this are as follows:

- Vacancy surveys measure the number of reported vacancies in budgeted positions at one point in time. The net requirements shown in this report reflect shortages in the available labour supply over the entire year. It is important to note that budgeted positions and available labour supply may be at variance, and that a vacancy survey at one point in time may not directly correspond to the labour situation over an entire year.

- The net occupational shift assumption has been subtracted out of a full-time equivalent stock which assumed a breakdown of 60% full-time and 40% part-time registered nurses with part-time workers calculated to represent .4 FTE in British Columbia, Alberta and Saskatchewan and .5 FTE in Manitoba. If the full-time equivalent assumption is incorrect or if the vacancy pattern does not correspond to the full-time equivalency mix, the resultant net requirements will not match.

- The vacancy survey reflects actual vacancies in budgeted positions only and this may be underestimating the actual number of vacancies if budgetary restrictions imposed on nursing employers have artificially reduced their requirements at any one point in time. In other words, the level of projected requirement shown in this report may not necessarily be identical to that currently being experienced.

The foregoing analysis indicates the extreme sensitivity of projected net requirements to changes in the net occupational shift factor utilized. Until more accurate information is available on this critical factor, better or more reliable projections of net requirements cannot be made.

Projected Supply Trends

The historical trend in supply differs from the projected forecast trend. It appears that, historically, the supply of registered nurses has not declined. Saskatchewan's supply has remained static in recent years, while Alberta, British Columbia and Manitoba have experienced increases in supply. The projections contained in this report, under the -8% net occupational shift assumption, have shown a moderate increase in supply in British Columbia, Alberta and Manitoba, and a decrease in Saskatchwan over the 20 year forecast period. Under the -10% net occupational shift assumption, British Columbia would experience an increase in supply, Alberta and Saskatchewan would experience a decrease in supply, and Manitoba's supply would be static. The reasons why the historical trends in supply may differ from the projected forecast trend may be attributable to a variety of complex factors which could not be measured in the past, nor accurately projected into the future. The model developed for this study used a number of critical factors known to effect the supply of registered nurses (migration, immigration, training, and net occupational shift). The historical trend in the migration and immigration factors may have been misleading if the historical records, as recorded by associations, were not accurate. Training assumptions used in this report were based on the information provided, however several key assumptions were made about the participation of entry level and refresher level graduates in the workforce which could not be compared with historical information. As indicated earlier, the net occupational shift assumption is undoubtedly the most critical assumption for future supply projections and thus selection of two values (-8% and -10%) held constant over the entire projection period could have exaggerated the trend in supply. In addition to the factors used to develop the supply projections contained in this report, there are other factors which impact on the supply which could not be incorporated as part of the forecasting model as there is no information

available to measure either the historical impact of these factors or their likely future impact. Some of these factors could include:

- availability of employment opportunities outside of the nursing profession;
- general economic conditions;
- social changes encouraging/discouraging movement into/out of nursing professions;
- availability/shortage of day care facilities for working mothers;
- divorce rates influencing a decision to return to the workforce or to increase labour participation rate;
- image of the profession influencing prospective students choosing a career path;
- salary and benefits for nursing positions relative to length of training required, working conditions, career mobility in comparison to other industry sectors.

According to Association spokesmen, nursing employers and research undertaken by others, the nursing professions are currently facing many major occupational issues. These issues have been commented on in this report and this may in part explain why the historical trend in supply may differ from the projected supply.

Requirement Assumptions

The service utilization approach was used to project the number of full-time equivalent registered nurses required in each province from 1981-2000. The number of active treatment patient days in each province in 1980 was obtained from government sources and this information was used to project the number of active treatment patient days from 1981-2000 using medium population projections. The ratio of active full-time equivalent registered nurses required to meet the projected patient days was held constant. The following ratios were used:

EXHIBIT B-4

SUMMARY OF MINIMUM INCREASE IN NUMBER OF BEDS REQUIRED

BRITISH COLUMBIA

YEAR	PATIENT DAYS	MINIMUM # OF BEDS	MINIMUM INCREASE
1981	3428813	9392	0
1982	3508388	9612	220
1983	3588488	9831	219
1984	3673653	10065	233
1985	3760962	10304	239
1990	4171874	11428	1124
1995	4627644	12678	1251
2000	5051648	13840	1162

ALBERTA

YEAR	PATIENT DAYS	MINIMUM # OF BEDS	MINIMUM INCREASE
1981	3153278	8639	0
1982	3274221	8970	331
1983	3399444	9314	343
1984	3517725	9638	324
1985	3626394	9935	298
1990	4140983	11345	1410
1995	4666892	12784	1439
2000	5245215	14370	1587

SASKATCHEWAN

YEAR	PATIENT DAYS	MINIMUM OF BEDS	MINIMUM INCREASE
1981	1639341	4491	0
1982	1669356	4574	82
1983	1699632	4657	83
1984	1729647	4739	82
1985	1759481	4820	82
1990	1981385	5209	389
1995	2037627	5583	373
2000	2184831	5986	403

MANITOBA

YEAR	PATIENT DAYS	MINIMUM # OF BEDS	MINIMUM INCREASE
1981	1524216	4176	0
1982	1541682	4224	48
1983	1560870	4276	53
1984	1580858	4329	53
1985	1600968	4386	57
1990	1699868	4657	271
1995	1771692	4854	197
2000	1848018	5043	189

TABLE B-2

Ratio of Full-time Equivalent Registered Nurses
to Active Treatment Patient Days in Each Province

Province	Number of Full-time Equivalents per Active Treatment Patient Day
British Columbia	1:267
Alberta	1:264
Saskatchewan	1:261
Manitoba	1:246

Two analyses were undertaken using this approach. The most recent ratio, as shown above, was computed using the number of active full-time equivalent registered nurses as reported in 1980 and an average ratio for the last five years. The difference in net requirement was marginal and we selected the most recent ratio as the most likely range of future requirement.

The projected requirement for full-time equivalent registered nurses is based on projected patient days and assumes that active treatment hospital beds will be available to meet the projected number of patient days. Exhibit B-4, opposite, identifies the projected patient days based on medium population growth and the associated hospital beds. The number of beds were arrived at through the simple calculation of patient days divided by 365 which assumes 100% occupancy rate, which is conservative. It must be recognized that the patient days and associated bed numbers, must be available, as if beds are not available to meet the patient days, the manpower requirements identified in our report may be overestimated. (Saskatchewan has indicated, for example, that they expect that beds per capita will decrease in future.) The strong trend towards ambulant and home care of patients as an alternative to in-patient care which may impact on the number of nursing professionals required is recognized. However, it is not anticipated that the nursing manpower requirements for other than in-patient care would be as great. Therefore, if hospital beds are not provided to meet the projected patient days, and increased ambulatory and home care programs are provided as an alternative, the projected requirements indicated in this report may be overestimated.

We obtained from Alberta, estimates of the number of planned active treatment beds to be constructed to 1988. Analysis indicated that Alberta would need, at a minimum, approximately 2,150 more beds, and Alberta plans to construct approximately 2,800 beds by 1988. No information was available from other provinces on planned hospital construction. It is important for all provinces to recognize that the timing of hospital construction will impact on the requirement for nursing professionals and there will be a need to continually re-examine bed projections and the associated nursing requirements.

The general assumptions implicit in this approach have been set out in the text of this report. Unfortunately, there is no information available to accurately assess whether this approach is reliable. Because of the serious concerns regarding the occupational issues facing this profession, attention should be focussed on the 1981-1985 timeframe and research should be undertaken to develop a more accurate means of developing requirement projections.

PROVINCIAL ASSUMPTIONS

Assumptions were made with respect to the key supply factors used to develop supply projections. This section sets out each of the numerical or percentage values used and the sources of this information for each province.

Exhibits B-5 to B-8, following, summarize the historical full-time equivalent calculations, the assumptions made for each of the supply factors and sources of this information for each Province.

SUMMARY OF NET REQUIREMENTS

Exhibits B-9 to B-16, following, set out the projected supply scenarios, the projected requirement and the net requirement for full-time equivalent registered nurses in each Province and in the western region.

- Exhibits B-9 and B-10 show the projected supply, requirement and net

requirement based on a net occupational shift of -8% (Scenario I) and -10% (Scenario II). All other supply assumptions were held constant from 1981-2000.

- Exhibits B-11 and B-12 show the effect of implementing Strategy A - increasing entry-level training outputs in 1984 by approximately one-third over planned levels in British Columbia, Alberta, and Saskatchewan, and by 4% in Manitoba.

- Exhibits B-13 and B-14 show the effect of implementing Strategy B - reducing the net occupational shift factor. Exhibit 13 shows the effect of gradually reducing the net occupational shift from -8% to -5% from 1981-2000. Exhibit 14 shows the effect of gradually reducing the net occupational shift from -10% to -6% from 1981-2000.

- Exhibits B-15 and B-16 show the effect of implementing Strategy C - increasing training outputs by approximately one-third over planned levels in British Columbia, Alberta and Saskatchewan and by 4% in Manitoba, and reducing the net occupational shift factor. Exhibit 15 shows the combined effect of this strategy assuming a -8% net occupational shift in 1981. Exhibit 16 shows the combined effect of this strategy assuming a -10% net occupational shift in 1981.

This information is the output from the computer planning model developed for this study and was used for the analysis of the various alternative strategies discussed in this report. The graphic interpretation of this information, rounded to the nearest hundred, has been set out in the text of this report.

AGE BREAKDOWN

The age breakdown of active practitioners registered with the respective registered nurses' associations in each province is set out in Exhibits B-17 to B-20, following.

For consistency, the source of this information is Statistics Canada, Revised

R.N. Data Series, 1980. It should be noted that this information includes only those identified as nurses employed in nursing who registered in the first four months of the registration renewal period. The totals shown may not necessarily correspond with that used as the opening stock figure in this report because of the time differences. Where sex was not stated, these individuals have been included as females under the "age group - not stated" category.

EXHIBIT B-5

FULL-TIME EQUIVALENT REGISTERED NURSES

BRITISH COLUMBIA

YEAR	TOTAL ACTIVE	FULL-TIME NUMBER	FULL-TIME %	PART-TIME NUMBER	PART-TIME %	TOTAL FULL-TIME EQUIVALENT (USING 0.4)
1976	14,691	10,244	69.7	4,447	30.3	12,023
1977	13,786	9,657	70.0	4,129	30.0	11,309
1978	14,206	10,055	70.8	4,151	29.2	11,715
1979	15,297	9,813	64.1	5,484	35.9	12,007
1980	16,142	10,204	63.2	5,938	36.8	12,579

SOURCE: Statistics Canada - Revised R.N. Data Series, Health Manpower Statistics Section, Health Division, July 1981.

SUPPLY FACTORS	NUMERICAL OR PERCENTAGE VALUE	SOURCE
Opening Stock	12,579 f.t.e.	As calculated above
Net Migration	+4% of opening stock	B.C. Health Research Unit
Net Immigration	0	B.C. Health Research Unit
Net Occupational Shift	-8% and -10%	PMP assumption
Training Output (Entry Level)	757 f.t.e.	B.C. Department of Education
Training Output (Refresher Level)	76 f.t.e.	B.C. Department of Education

EXHIBIT B-6

FULL-TIME EQUIVALENT REGISTERED NURSES

ALBERTA

YEAR	TOTAL ACTIVE	FULL-TIME NUMBER	FULL-TIME %	PART-TIME NUMBER	PART-TIME %	TOTAL FULL-TIME EQUIVALENT (USING 0.4)
1975	10,664	9,129	85.6	1,535	14.4	9,743
1976	11,060	9,004	81.4	2,056	18.6	9,826
1977	11,801	9,482	80.3	2,319	19.7	10,405
1978	12,841	10,068	78.4	2,773	21.6	11,177
1979	13,923	8,824	63.3	5,099	36.6	10,864
1980	14,812	9,154	61.8	5,658	38.2	11,417

SOURCE: Alberta Association for Registered Nurses.
Adjusted total shown excludes out-of-province residents and those active in education.

SUPPLY FACTORS	NUMERICAL OR PERCENTAGE VALUE	SOURCE
Opening Stock	11,417 f.t.e.	As calculated above.
Net Migration	1.5% of opening stock	Alberta Association for Registered Nurses
Net Immigration	-0.4% of opening stock	Alberta Association for Registered Nurses
Net Occupational Shift	-8% and -10%	PMP assumption
Training Output (Entry Level)	730 f.t.e.	Alberta Department of Advanced Education
Training Output (Refresher Level)	172 f.t.e.	Alberta Department of Advanced Education

EXHIBIT B-7

FULL-TIME EQUIVALENT REGISTERED NURSES

SASKATCHEWAN

YEAR	TOTAL ACTIVE	FULL-TIME		PART-TIME		TOTAL FULL-TIME EQUIVALENT (USING 0.4)
		NUMBER	%	NUMBER	%	
1975	7,050	6,035	85.6	1,015	14.4	6,441
1976	6,440	5,242	81.4	1,198	18.6	5,721
1977	6,024	4,838	80.3	1,186	19.7	5,312
1978	7,088	5,557	78.4	1,531	21.6	6,169
1979	7,912	5,016	63.4	2,896	36.6	6,174
1980	8,003	4,954	61.9	3,049	38.1	6,175

SOURCE: Saskatchewan Association for Registered Nurses

SUPPLY FACTORS	NUMERICAL OR PERCENTAGE VALUE	SOURCE
Opening Stock	6,175 f.t.e.	As calculated above.
Net Migration	-1.5% of opening stock	Saskatchewan Association for Registered Nurses
Net Immigration	-1.0% of opening stock	Saskatchewan Association for Registered Nurses
Net Occupational Shift	-8% and -10%	PMP assumption
Training Output (Entry Level)	357 f.t.e. in 1981 412 f.t.e. in 1982-2000	Saskatchewan Department of Continuing Education
Training Output (Refresher Level)	26 f.t.e.	Saskatchewan Department of Continuing Education

EXHIBIT B-8

FULL-TIME EQUIVALENT REGISTERED NURSES
MANITOBA

YEAR	TOTAL ACTIVE	FULL-TIME NUMBER	FULL-TIME %	PART-TIME NUMBER	PART-TIME %	TOTAL FULL-TIME EQUIVALENT (USING 0.5)
1975	6,515	5,798	89.0	717	11.0	6,156
1976	6,898	5,587	81.0	1,311	19.0	6,243
1977	7,226	5,781	80.0	1,445	20.0	6,504
1978	7,402	5,773	78.0	1,628	22.0	6,587
1979	7,446	4,691	63.0	2,755	37.0	6.069
1980	7,548	4,680	62.0	2,868	38.0	6,114

SOURCE: Manitoba Association for Registered Nurses.

SUPPLY FACTORS	NUMERICAL OR PERCENTAGE VALUE	SOURCE
Opening Stock	6,114 f.t.e.	As calculated above.
Net Migration	-2.0% of opening stock	Manitoba Association for Registered Nurses
Net Immigration	0	Manitoba Association for Registered Nurses
Net Occupational Shift	-8% and -10%	PMP assumption
Training Output (Entry Level)	372 f.t.e. in 1981 525 f.t.e. in 1982 600 f.t.e. in 1983-2000	Manitoba Department of Education
Training Output (Refresher Level)	177 f.t.e. in 1981 159 f.t.e. in 1982 114 f.t.e. in 1983-2000	Manitoba Department of Education

EXHIBIT B-9

NET F.T.E. REQUIREMENT FOR REGISTERED NURSES
SCENARIO I - STATUS QUO

	British Columbia		Alberta		Saskatchewan		Manitoba		Region	
	Stock	Req.	Stock	Req.	Stock	Req.	Stock	Req.	Stock	Req.
1981	12,909	12,839	11,531	11,810	5,962	6,281	6,052	6,196	36,457	37,126
Net		-70		279		316		144		669
1982	13,225	13,140	11,638	12,265	5,776	6,396	6,130	6,267	36,769	38,066
Net		-85		625		620		137		1,297
1983	13,529	13,440	11,737	12,732	5,608	6,512	6,231	6,345	37,105	39,029
Net		-89		995		904		114		1,924
1984	13,759	13,759	11,829	13,175	5,457	6,627	6,322	6,423	37,367	39,984
Net		0		1,346		1,170		101		2,617
1985	14,101	14,086	11,915	13,582	5,322	6,741	6,404	6,508	37,742	40,917
Net		-15		1,667		1,419		104		3,175
1990	15,343	15,622	12,263	15,509	4,832	7,285	6,705	6,910	39,143	45,326
Net		279		3,246		2,453		205		6,183
1995	16,355	17,332	12,506	17,476	4,551	7,807	6,883	7,202	40,295	49,817
Net		977		4,970		3,256		319		9,522
2000	17,180	18,920	12,676	19,645	4,389	8,371	6,988	7,483	41,233	54,419
Net		1,740		6,969		3,982		495		13,186

EXHIBIT B-10

NET F.T.E. REQUIREMENT FOR REGISTERED NURSES
SCENARIO II - STATUS QUO

	British Columbia		Alberta		Saskatchewan		Manitoba		Region	
	Stock	Req.	Stock	Req.	Stock	Req.	Stock	Req.	Stock	Req.
1981	12,657	12,839	11,303	11,810	5,841	6,281	5,929	6,196	35,730	37,126
Net		182		507		440		267		1,396
1982	12,731	13,140	11,199	12,263	5,549	6,396	5,902	6,267	35,381	38,066
Net		409		1,064		847		365		2,685
1983	12,800	13,440	11,104	12,732	5,293	6,512	5,908	6,345	35,105	39,029
Net		640		1,628		1,219		437		3,924
1984	12,865	13,759	11,018	13,175	4,070	6,627	5,913	6,423	34,866	39,984
Net		894		2,157		1,557		510		5,118
1985	12,926	14,086	10,939	13,582	4,874	6,741	5,917	6,508	34,656	40,917
Net		1,160		2,643		1,867		591		6,261
1990	13,181	15,622	10,640	15,509	4,207	7,285	5,933	6,910	33,961	45,326
Net		2,441		4,869		3,078		977		11,365
1995	13,368	17,332	10,452	17,476	3,861	7,807	5,941	7,202	33,625	49,817
Net		3,964		7,024		3,943		1,261		16,192
2000	13,505	18,920	10,334	19,645	3,689	8,371	5,945	7,483	33,473	54,419
Net		5,415		9,311		4,682		1,538		20,946

EXHIBIT B-11

NET F.T.E. REQUIREMENT FOR REGISTERED NURSES
SCENARIO I - STRATEGY A

	British Columbia		Alberta		Saskatchewan		Manitoba		Region	
	Stock	Req.	Stock	Req.	Stock	Req.	Stock	Req.	Stock	Req.
1981	12,909	12,839	11,531	11,810	5,962	6,281	6,052	6,196	36,457	37,126
Net		-70		279		316		144		669
1982	13,225	13,140	11,638	12,263	5,776	6,396	6,130	6,267	36,769	38,066
Net		-85		625		620		137		1,297
1983	13,529	13,440	11,737	12,732	5,608	6,512	6,231	6,345	37,105	39,029
Net		-89		995		904		114		1,924
1984	14,064	13,759	12,069	13,175	5,580	6,627	6,347	6,423	38,060	39,984
Net		-305		1,106		1,047		76		1,924
1985	14,578	14,086	12,378	13,582	5,555	6,741	6,452	6,508	38,963	40,917
Net		-492		1,204		1,186		58		1,954
1990	16,853	15,622	13,632	15,509	5,465	7,285	6,836	6,910	42,786	45,326
Net		-1,231		1,877		1,820		74		2,540
1995	18,708	17,332	14,509	17,476	5,413	7,807	7,063	7,202	45,693	49,817
Net		-1,376		2,967		2,394		139		4,124
2000	20,220	18,920	15,123	19,645	5,383	8,371	7,197	7,483	47,923	54,419
Net		-1,300		4,522		2,988		268		6,496

EXHIBIT B-12

NET F.T.E. REQUIREMENT FOR REGISTERED NURSES
SCENARIO II - STRATEGY A

	British Columbia		Alberta		Saskatchewan		Manitoba		Region	
	Stock	Req.	Stock	Req.	Stock	Req.	Stock	Req.	Stock	Req.
1981	12,657	12,839	11,303	11,810	5,841	6,281	5,929	6,196	35,730	37,126
Net		182		507		440		267		1,396
1982	12,731	13,140	11,199	12,263	5,549	6,396	5,902	6,267	35,381	38,066
Net		409		1,064		847		365		2,685
1983	12,800	13,440	11,104	12,732	5,293	6,512	5,908	6,345	35,105	39,029
Net		640		1,628		1,219		437		3,924
1984	13,108	13,759	11,258	13,175	5,193	6,627	5,938	6,423	35,497	39,984
Net		651		1,917		1,434		485		4,487
1985	13,397	14,086	11,398	13,582	5,105	6,741	5,964	6,508	35,864	40,917
Net		689		2,184		1,636		544		5,053
1990	14,604	15,622	11,932	15,509	4,804	7,285	6,056	6,910	37,396	45,326
Net		1,018		3,577		2,481		854		7,930
1995	15,490	17,332	12,267	17,476	4,650	7,807	6,104	7,202	38,511	49,817
Net		1,842		5,209		3,157		1,098		11,306
2000	16,140	18,920	12,477	19,645	4,571	8,371	6,130	7,483	39,318	54,419
Net		2,780		7,168		3,800		1,353		15,101

EXHIBIT B-13

NET F.T.E. REQUIREMENT FOR REGISTERED NURSES
SCENARIO I - STRATEGY B

	British Columbia		Alberta		Saskatchewan		Manitoba		Region	
	Stock	Req.	Stock	Req.	Stock	Req.	Stock	Req.	Stock	Req.
1981	12,867	12,839	11,493	11,810	5,944	6,281	6,031	6,196	36,335	37,126
Net		-28		317		337		165		791
1982	13,142	13,140	11,564	12,263	5,738	6,396	6,092	6,267	36,536	38,066
Net		-2		699		658		175		1,530
1983	13,406	13,440	11,629	12,732	5,554	6,512	6,176	6,345	36,765	39,029
Net		34		1,103		958		169		2,264
1984	13,744	13,759	11,765	13,175	5,426	6,627	6,292	6,423	37,227	39,984
Net		15		1,410		1,201		131		2,757
1985	14,069	14,086	11,891	13,582	5,311	6,741	6,396	6,508	37,667	40,917
Net		-17		1,691		1,430		112		3,250
1990	15,980	15,622	12,768	15,509	5,032	7,285	6,972	6,910	40,752	45,326
Net		-358		2,741		2,253		-62		4,574
1995	18,490	17,332	14,057	17,476	5,090	7,807	7,660	7,202	45,297	49,817
Net		-1,158		3,419		2,717		-458		4,520
2000	21,468	18,920	15,558	19,645	5,289	8,371	8,367	7,483	50,682	54,419
Net		-2,548		4,087		3,082		-884		3,737

EXHIBIT B-14

NET F.T.E. REQUIREMENT FOR REGISTERED NURSES
SCENARIO II - STRATEGY B

	British Columbia		Alberta		Saskatchewan		Manitoba		Region	
	Stock	Req.	Stock	Req.	Stock	Req.	Stock	Req.	Stock	Req.
1981	12,657	12,839	11,303	11,810	5,841	6,281	5,929	6,196	35,730	37,126
Net		182		507		440		267		1,396
1982	12,731	13,140	11,199	12,263	5,549	6,396	5,902	6,267	35,381	38,066
Net		409		1,064		847		365		2,685
1983	12,800	13,440	11,104	12,732	5,293	6,512	5,908	6,345	35,105	39,029
Net		640		1,628		1,219		437		3,924
1984	12,981	13,759	11,119	13,175	5,118	6,627	5,966	6,423	35,184	39,984
Net		778		2,056		1,509		457		4,800
1985	13,153	14,086	11,132	13,582	4,963	6,741	6,019	6,508	35,267	40,917
Net		933		2,450		1,778		489		5,650
1990	14,094	15,622	11,348	15,509	4,483	7,285	6,293	6,910	36,218	45,326
Net		1,528		4,161		2,802		617		9,108
1995	15,386	17,332	11,908	17,476	4,367	7,807	6,665	7,202	38,326	49,817
Net		1,946		5,568		3,440		537		11,491
2000	17,463	18,920	12,832	19,645	4,477	8,371	7,282	7,483	42,054	54,419
Net		1,457		6,813		3,894		201		12,365

EXHIBIT B-15

NET F.T.E. REQUIREMENT FOR REGISTERED NURSES
SCENARIO I - STRATEGY C

	British Columbia		Alberta		Saskatchewan		Manitoba		Region	
	Stock	Req.	Stock	Req.	Stock	Req.	Stock	Req.	Stock	Req.
1981	12,867	12,839	11,493	11,810	5,944	6,281	6,031	6,196	36,335	37,126
Net		-28		317		337		165		791
1982	13,142	13,140	11,564	12,263	5,738	6,396	6,092	6,267	36,536	38,066
Net		-2		699		658		175		1,530
1983	13,406	13,440	11,629	12,732	5,554	6,512	6,176	6,345	36,765	39,029
Net		34		1,103		958		169		2,264
1984	13,987	13,759	12,003	13,175	5,549	6,627	6,317	6,423	37,856	39,984
Net		-228		1,170		1,078		106		2,128
1985	14,546	14,086	12,355	13,582	5,545	6,741	6,444	6,508	38,890	40,917
Net		-460		1,227		1,196		64		2,027
1990	17,537	15,622	14,180	15,509	5,684	7,285	7,106	6,910	44,507	45,326
Net		-1,915		1,329		1,601		-196		819
1995	21,072	17,332	16,250	17,476	6,035	7,807	7,856	7,202	51,208	49,817
Net		-3,740		1,226		1,777		-654		-1,391
2000	25,087	18,920	18,443	19,645	6,447	8,371	8,610	7,483	58,587	54,419
Net		-6,167		1,202		1,924		-1,127		-4,168

EXHIBIT B-16

NET F.T.E. REQUIREMENT FOR REGISTERED NURSES
SCENARIO II - STRATEGY C

	British Columbia		Alberta		Saskatchewan		Manitoba		Region	
	Stock	Req.	Stock	Req.	Stock	Req.	Stock	Req.	Stock	Req.
1981	12,657	12,839	11,303	11,810	5,841	6,281	5,929	6,196	35,730	37,126
Net		182		507		440		267		1,369
1982	12,731	13,140	11,199	12,263	5,549	5,902	35,381	6,267	35,048	38,066
Net		409		1,064		847		365		2,665
1983	12,800	13,440	11,104	12,732	5,293	6,512	5,908	6,345	35,105	39,029
Net		640		1,628		1,219		437		3,924
1984	13,224	13,759	11,359	13,175	5,241	6,627	5,991	6,423	35,815	39,984
Net		535		1,816		1,386		432		4,169
1985	13,627	14,086	11,593	13,582	5,194	6,741	6,066	6,508	36,480	40,917
Net		459		1,989		1,547		442		4,437
1990	15,574	15,622	12,691	15,509	5,104	7,285	6,421	6,910	39,790	45,326
Net		48		2,818		2,181		489		5,536
1995	17,723	17,332	13,900	17,476	5,225	7,807	6,844	7,202	43,692	49,817
Net		-391		3,576		2,582		358		6,125
2000	20,673	18,920	15,376	19,645	5,510	8,371	7,381	7,483	48,940	54,419
Net		-1,753		4,269		2,861		102		5,479

EXHIBIT B-17

TOTAL NUMBER OF ACTIVE REGISTERED NURSES IN BRITISH COLUMBIA BY AGE

AGE GROUP	MALE	FEMALE	TOTAL
0 - 24	1	797	798
25 - 29	39	3,065	3,104
30 - 34	65	2,739	2,804
35 - 39	78	2,613	2,691
40 - 44	50	2,049	2,099
45 - 49	29	1,664	1,693
50 - 54	15	1,348	1,363
55 and over	17	1,558	1,575
Not stated	1	14	15
Total	295	15,847	16,142

SOURCE: Statistics Canada, R.N. Data Series, Registered Nurses Survey, 1980. Figures shown above include only those identified as nurses employed in nursing who registered in the first four months of the registration renewal period. This figure may not necessarily correspond to that used as the "opening stock" figure shown in Exhibit B-5.

EXHIBIT B-18

TOTAL NUMBER OF ACTIVE REGISTERED NURSES IN ALBERTA BY AGE

AGE GROUP	MALE	FEMALE	TOTAL
0 - 24	2	703	705
25 - 29	14	3,214	3,228
30 - 34	41	2,656	2,697
35 - 39	39	2,102	2,141
40 - 44	19	1,552	1,571
45 - 49	14	1,198	1,212
50 - 54	9	970	979
55 and over	3	1,052	1,055
Not stated	—	72	72
Total	141	13,519	13,660

SOURCE: Statistics Canada, R.N. Data Series, Registered Nurses Survey, 1980. Figures shown above include only those identified as nurses employed in nursing who registered in the first four months of the registration renewal period. These figures may not necessarily correspond with that used as the "opening stock" figure shown in Exhibit B-7.

EXHIBIT B-19

TOTAL NUMBER OF ACTIVE REGISTERED NURSES IN MANITOBA BY AGE

AGE GROUP	MALE	FEMALE	TOTAL
0 - 24	1	470	471
25 - 29	27	1,623	1,650
30 - 34	38	1,312	1,350
35 - 39	33	972	1,005
40 - 44	25	774	799
45 - 49	6	568	574
50 - 54	12	434	446
55 and over	6	612	618
Not stated	—	3	3
Total	148	6,768	6,916

SOURCE: Statistics Canada, R.N. Data Series, Registered Nurses Survey, 1980. Figures shown above include only those identified as nurses employed in nursing who registered in the first four months of the registration renewal period. These figures may not necessarily correspond with that used as the stock" figure shown in Exhibit B-8.

EXHIBIT B-20

TOTAL NUMBER OF ACTIVE REGISTERED NURSES IN SASKATCHEWAN BY AGE

AGE GROUP	MALE	FEMALE	TOTAL
0 - 24	5	480	485
25 - 29	14	1,537	1,551
30 - 34	15	1,015	1,030
35 - 39	11	782	793
40 - 44	3	720	723
45 - 49	1	633	634
50 - 54	5	495	500
55 and over	3	607	610
Not stated	0	31	31
Total	57	6,300	6,357

SOURCE: Statistics Canada, R.N. Data Series, Registered Nurses Survey, 1980. Figures shown above include only those identified as nurses employed in nursing who registered in the first four months of the registration renewal period. These figures may not necessarily correspond with that used as the "opening stock" figure in Exhibit B-7.

APPENDIX C

BIBLIOGRAPHY

REPORTS

Alberta Hospital Association, Nursing Manpower - A Study of Nursing Supply and Demand in Alberta Hospitals and Nursing Homes, 1980.

Alberta Association of Registered Nurses, Nursing Manpower Needs in Alberta - Current and Future, 1980.

Canadian Association of Practical and Nursing Assistants, Presentation to the Minister, Department of National Health and Welfare, July 1979.

Canadian Nurses Association, Putting "Health" into Health Care, 1980.

Filoromo, T. and Ziff, D., Nurse Recruitment: Strategies for Success, Rockville: Aspen Systems Corporation, 1980, p. 137 - 149.

Foothills Hospital School of Nursing, Survey '79 - A Follow-up of Foothills Hospital School of Nursing Graduates and their Career Patterns 1968 through 1978, 1980.

Government of Saskatchewan, Analysis of Psychiatric Nurses' Staffing Patterns, September 1980.

Manitoba Association of Registered Nurses, Nursing Education: Challenge and Change, 1975.

Psychiatric Nurses' Association of Alberta, A Position Paper Regarding Psychiatric Nursing in the Mental Health Care Delivery System in Alberta, August 1978.

Province of Alberta, Report of the Joint Ministerial Task Force on Nursing Education in Manitoba, 1977.

Registered Nurses Association of Ontario, Report of Task Force on Nursing Shortage, 1981.

Saskatchewan Psychiatric Nurses' Association, Executive Director's Report - Annual Meeting 1980-81.

Saskatchewan Psychiatric Nurses' Association, Degree Program Interest Survey, 1980, (draft report).

Saskatchewan Registered Nurses' Association, Survey of Inactive Nurses, 1980.

St. Boniface General Hospital, Report of the Task Force on Nursing Manpower in the 1980's, October 1981.

University of British Columbia, Health Services Research and Development, Registered Psychiatric Nurses in British Columbia, 1977 - A Descriptive Report, 1980.

University of British Colmbia, Health Services Research and Development, A Survey of Difficult-to-Fill Positions for Registered Nurses and Other Health Care Disciplines in British Columbia, 1980 - First Year-end Report.

University of British Columbia, Health Services Research and Development, ROLLCALL 79, A Status Report of Health Personnel in the Province of British Columbia, March 1980.

University of British Columbia, Health Services Research and Development, ROLLCALL UPDATE 80, A Status Report of Selected Health Personnel in the Province of British Columbia, December 1980.

University of Texas (Austin), Centre for Research, School of Nursing, Conditions Associated with Registered Nurses Employment in Texas, 1980.

U.S. Department of Commerce, Public Health Centre Service, Bethesda, Md. Division of Nursing, Review and Evaluation of Nursing Productivity, Volume III, Literature and Research Review, 1975.

U.S. Department of Health, Education and Welfare, Public Health Service, Health Resources Administration, Nursing Staffing Requirements and Related Topic: A Selected Bibliography, 1979.

National Commission on Nursing (U.S.), Abstracts of State Study and Policy Documents, 1981.

Flaherty, Dr. M. Josephine, Health and Welfare Canada, Employment for Registered Nurses in Canada, 1980.

JOURNAL ARTICLES

Alberta Association of Registered Nurses, "Drastic Nursing Shortage Predicted Unless....", AARN Newsletter, April 1980.

Alberta Association of Registered Nurses, "Supply of Nurses - Can we meet the demand?", AARN Newsletter, November 1980.

Alberta Association of Registered Nurses, "AHA Nursing Manpower Study of Factors in Nursing Supply and Demand", November 1980", AARN Newsletter, March 1981.

Alberta Hospital Association, Management Analysis and Planning Services, "A Proposal for an Analysis of Nursing Manpower Resources and Requirements in Alberta, unpublished, March 1980.

American Nurses Association, "Survey Shows a Million RNs Employed", The American Nurse, October 1980.

Araiyo, M., "Creative Nursing Administration Sets the Climate for Retention", Hospitals, May 1, 1980.

Arnold, Nancy, "Where have all the nurses gone?", British Medical Journal, January 1980.

Association of Operating Room Nurses, "RN Supply Predicted to be Adequate by 1985", AORN Journal, August 1979.

Association of Western Hospitals, "The Nursing Shortage: Current Trends in Recruitment and Retention", AWA Convention Report, September 1980.

Aycock, Edward J. "Nursing - Productivity Gains Under your Control", Hospital Topics, May/June 1978.

Bergman, Rebecca, "Nursing Manpower: Issues and Trends", Journal of Nursing Administration, May 1975.

Brief, Arthur, "Turnover Among Hospital Nurses: A Suggested Model", Journal of Nursing Administration, October, 1979.

Brown, Beverley I. "Realistic Workloads for Community Health Nurses", Nursing Outlook, April 1980.

Del Bueno, D. et al., "Two Ways to Retain Staff", American Journal of Nursing, April 1, 1978.

Driscoll, Veronica M. "Remedies for a Troubled Health Care System", N.Y. State News Association Journal, December 1980.

Fralic, Maryann F., "Nursing Shortage: Coping Today and Tomorrow", Hospitals, May 1980.

Hospitals, "Nursing Shortage Linked to Hospital Environment", January 1980.

Howie, Heather, "What do they have that we don't"?, Health Care, April 1981.

Johnson, Walter L., "Supply and Demand for Registered Nurses - Some observations on the current picture and prospects to 1985" (Part 1 and 2), "Nursing Health Care", August 1980.

Kaiser, P., "Ten Steps to Interviewing Job Applicants", American Journal of Nursing, April, 1978.

International Nursing Review, "Nursing Shortage is Acute in U.S.", March-April 1980.

Journal of Advanced Nursing, "Male/Female Dichotomy in the Nursing Profession in a Time of Social Change", January 1978.

Journal of Gerontological Nursing, Editorial, October 1980.

Kallisch, Phillip A., "The Nursing Shortage, the President and the Congress", Nursing Forum, 1980.

Kuhn, Barbara G., "Prediction of Nursing Requirements from Patient Characteristics - II", International Journal of Nursing Studies, 1980.

Link, Charles R. and Settle, Russell F., "Financial Incentive and Labour Supply of Married Professional Nurses: An Economic Analysis", Nursing Research, July/August 1980.

Link, Charles R. and Settle, Russel F., "Wage Incentive and Married Professional Nurses: A Case of Backward - bending Supply?", Economic Inquiry, February 1969.

Levine, Eugene, "Nursing Manpower - Yesterday, Today, and Tomorrow", American Journal of Nursing, February 1969.

New Zealand Nursing Journal, Editorial "Nursing Manpower Planning - A Matter of Urgency", July 1980.

Allen, Michael, "Finding Nurses for the Future - The Recruitment and Selection of Nurse Learners", Nursing Times, January 1981.

Windsor, Ralph and Collinson, Patricia, "Looking for Tomorrow's Nurses", Nursing Times, October 1980.

Royal, G.C. "Filling the Nursing Schools - A Question of Cost and Calibre", Nursing Times, November 1980.

Seybolt, J.W., and Walker, D.D., "Attitude Survey Proves to be a Powerful Tool for Reversing Turnover", Hospitals, May 1, 1980.

Sheridan, J.E. et al., "Predicting Leadership Behavior in a Hospital Organization", Academy of Management Journal, December, 1978.

Mercer, Geoffrey, "Nurse Employment and Mobility of Trained Staff", Nursing Times, November 1980.

Logan, Winifred, "The migration of nursing personnel", International Nursing Review, July/August 1980.

Marron-Cost, Joan, "Productivity: Key to Cost Containment", Hospitals, September 1980.

McCullough, D.M., "Nursing Manpower Planning", World of Irish Nursing, January 1977.

Quinn, Sheila, "Zero Growth", Nursing Mirror, October 1980.

Watson, L.A., "Keeping Qualified Nurses", Supervisor Nurse, October, 1979.

White, Charles, "Nursing Shortage, Turnover and Some Proposed Solutions", Hospital Forum, June 1977.

White, Charles, "Where Have All the Nurses Gone - and Why?", Hospitals, May, 1980.

White, Charles, "Redefining Professional Nursing: Solution to the Chronic Shortage", Hospital Progress, October 1981.

Province of
British Columbia

Province of
Alberta

Province of
Saskatchewan

Province of
Manitoba

WESTERN CANADA
HEALTH MANPOWER TRAINING STUDY

Category #4 - Report XXI

PSYCHIATRIC NURSES

Report XXII - NURSING ASSISTANTS

Report XXI - PSYCHIATRIC NURSES

REPORT XXI

PSYCHIATRIC NURSES:

THE REQUIREMENT FOR ALTERNATIVE TRAINING AND FUNDING ARRANGEMENTS IN WESTERN CANADA

WESTERN CANADA HEALTH MANPOWER TRAINING STUDY
CATEGORY #4 - REPORT XXI
PSYCHIATRIC NURSES

TABLE OF CONTENTS

			Page
I	-	INTRODUCTION	I-1
		Study Background	I-1
		Study Objectives	I-2
		Study Approach	I-2
		Scope of This Report	I-4
		Report Format	I-7
II	-	PROJECTED SUPPLY AND REQUIREMENT FOR PSYCHIATRIC NURSES IN THE WESTERN REGION	II-1
		Western Canada Overview	II-1
		Timing and Location of Manpower Requirements	II-7
		Summary	II-10
III	-	PRESENT AND FUTURE MANPOWER STRATEGIES	III-1
		Existing Training Programs	III-1
		Occupational Issues	III-3
		Alternative Manpower Strategies	III-9
IV	-	RECOMMENDATIONS	IV-1
		Western Region Recommendations	IV-1
		Provincial Recommendations	IV-6
		British Columbia	IV-8
		Alberta	IV-10
		Saskatchwan	IV-12
		Manitoba	IV-14

EXHIBITS — **Opposite Page**

1.	Projected Supply and Requirement for Psychiatric Nurse in the Western Region	II-1
2.	Projected Supply and Requirement for Psychiatric Nurses (By Province)	II-7
3.	Training Program Output of Psychiatric Nurses in the Western Region in 1981	III-2
4.	Effect of Implementing Strategy A on the Projected Supply and Requirement for Psychiatric Nurses	III-12

TABLE OF CONTENTS - CONT'D

EXHIBITS — Opposite Page

5. Effect of Implementing Strategy B on the Projected Supply and Requirement for Psychiatric Nurses III-14

6. Effect of Implementing Strategy C on the Projected Supply and Requirement for Psychiatric Nurses III-16

7. Effect of Various Alternative Strategies on the Projected Supply and Requirement for Psychiatric Nurses III-17

TABLES — Page

1. Projected Net Requirement for Psychiatric Nurses in Western Canada 1981 - 2000 ..... II-7

2. Projected Net Requirement for Psychiatric Nurses (By Province) II-10

3. Present and Future Entry-Level Training Outputs in the Western Region III-11

4. Net Requirement for Psychiatric Nurses in Western Canada III-17

APPENDICES — Page

A - Study Approach and Methodology A-1

B - Provincial Net Manpower Requirements B-1

C - Bibliography C-1

I - INTRODUCTION

This section sets out the overall study objectives and approach to the Western Canada Health Manpower Training Study. This section also outlines the scope and format of this report on psychiatric nurses in the western region.

The relationship between psychiatric nurses and other nursing professions is very important. This report on the future supply and requirement for psychiatric nurses should be read in conjunction with the reports on registered nurses and nursing assistants issued separately.

STUDY BACKGROUND

The provision of effective health services to the community is, to a considerable degree, dependent on three essential resources:

- an adequate supply of well trained staff in each health occupation group;
- the development of adequate facilities to service the community;
- the availability of adequate funds to ensure cost effective and efficient health services.

The range and complexity of health treatment programs has expanded greatly in Canada during the last twenty-five years. In addition, changing technology and the development of new treatment programs have resulted in an increased requirement for skilled, adequately trained health manpower. These factors have resulted in an increased emphasis on manpower planning and skill training for health occupations to ensure an adequate supply of trained practitioners to meet defined manpower requirements.

The nursing professions represent nearly two-thirds of all trained health occupational groups in western Canada and are an integral component of the

health care system. The provision of high quality nursing services is dependent not only on an adequate supply of well trained staff, but also on the participation of these trained individuals in the active work force.

STUDY OBJECTIVES

The Western Canada Health Manpower Training Study was initiated by the western Premiers at their annual conference in 1980.

The objectives of the study were to:

- assess the existing and future need for health manpower training programs and facilities in western Canada;
- make recommendations for the rationalization of the location and funding of health manpower training programs and facilities in western Canada.

STUDY APPROACH

The study was under the direction of a Steering Committee consisting of health and education government representatives from the provinces of British Columbia, Alberta, Saskatchewan and Manitoba. The study took place over two years and consisted of a review of 26 health occupations grouped into five categories.

Each occupation was studied separately and a report has been produced for each. In addition, a report examining the inter-relations of the occupations within each category has been submitted to the Steering Committee.

Category 4 comprised the following occupations:

- Registered Nurses
- Nursing Assistants
- Psychiatric Nurses

Data was collected from provincial associations and from government agencies for each of the occupations. For the nursing occupations, data was collected on the numbers of individuals registered with the Association over the last five years and the current status of these individuals as active or inactive practitioners. An attempt was also made to gather data on historical trends, the number of graduates from training, trends in movement of active practitioners to inactive status and occupational shifts out of the profession, trends in migration to or from other provinces, and immigration and emigration. In the cases where validated and reliable information was not available, association spokesmen, nursing employers and individuals in each of the nursing occupations were interviewed to provide qualitative opinions regarding present and future trends affecting the supply of and requirement for these professionals. Because of the relatively mobile nature of individuals working in the nursing profession, interviews were also held with nursing associations and health manpower planners in other provinces in Canada and in the United States.

An extensive literature review was conducted to examine the problems facing the nursing occupations, relevant research which has been undertaken with regard to these problems, and the solutions proposed by others. Earlier studies conducted by nursing associations, hospital associations and manpower planning commissions, as well as recent journal articles were reviewed. A bibliography of the literature review is contained in Appendix C to this report.

A computer model was used to assist in the preparation of projections on the future supply and requirement for each occupation. A critical analysis of these twenty-year projections was undertaken to develop the supply and requirement scenarios presented in this report.

The lack of a consistent historical data base made it difficult to develop accurate or reliable long-range projections of supply or requirement for the nursing occupations. The supply and requirement projections contained in this report are as accurate as can be achieved in light of the limited data base

now available.

A decision-making process to evaluate alternatives for the future funding and location of training programs was developed for this study. In the nursing occupations, each province presently has its own entry-level training programs offered at various settings. This study focused on the general requirement for training programs, rather than on the specific level or length of training to be provided. The funding of these programs was not examined, as each province is responsible for its own training programs for the nursing occupations.

The scope of the study of the nursing occupations was expanded to examine alternative manpower planning strategies other than training. This approach was adopted to address the particular problems facing the nursing occupations which significantly impact on the projected supply in both the short and longer term.

Separate documents describing the manpower planning methodology and the training decision-making process were issued. A brief summary of the overall study approach and methodology is set out in Appendix A, and details of the provincial net requirements are set out in Appendix B.

SCOPE OF THIS REPORT

In Category 4, three nursing professions were studied - registered nurses, nursing assistants and psychiatric nurses. This report summarizes the findings and recommendations for the occupation of psychiatric nurse.

For purposes of this study, a psychiatric nurse is defined as an individual who:

> "Gives nursing care to mentally and emotionally disturbed persons, directed by the physician, by performing any combination of the following duties:
>
> Gives prescribed medicines and injections according to approved nursing techniques. Makes rounds, in institution, with physician,

and assists physician when giving treatments or examining patients. Observes, records, and reports to supervisor or physician, patient's condition, or reaction to drugs, treatment given and other significant factors. Makes beds, bathes and feeds patients, and takes temperature reading, pulse rate and respiration count.

Assists patients to build up self-confidence and develop wholesome relationship with other people, by encouraging patients to participate in routine work functions, recreational, community and other therapeutic activities. Attends meetings with psychiatrists, psychologists, social workers, occupational therapists and other specialists for the purpose of evaluating patient and planning further therapy. May perform psychiatric nursing duties in a community by visiting and interviewing the mentally and emotionally ill person at home or clinic. May evaluate patient's adjustment in the community. May keep records on patient and submit referral information if patient moves to another community."[1]

Net Occupational Shift Factor

One of the most important factors affecting the projected supply of psychiatric nurses in western Canada is the net occupational shift factor. This factor has been defined as the net movement of psychiatric nurses from active to inactive status or from inactive to active status; movement into the profession from another profession or movement out of the psychiatric nursing profession to another profession; and attrition due to death or retirement. Historically this factor in the nursing professions has been erratic, but the reasons for this are not known. In developing the supply projections in this report, two net occupational shift values were used to demonstrate the extreme sensitivity of this factor. The factor of -8% (approximating a 12 year working life) and -10% (approximating a 10 year working life) were selected as a reasonable range on which to develop the supply projections in this report following discussions with professional associations and nursing employers. There is no information available to validate this key assumption. Because of the extreme sensitivity of this key factor and the lack of validated information to support the selection of -8% and -10% values used, the supply projections contained in this report should be viewed with some caution. For detailed discussion of the net occupational shift factor, refer to Appendix B.

---

1 Canadian Classification and Dictionary of Occupations, No. 3131-138, 1980.

Calculation of Full-time Equivalents (F.T.E.)

In the registered nurses and nursing assistants reports, all projections were based on full-time equivalents in order to better reflect the significant trend in recent years to increased proportions of these professionals working on a part-time basis. In this report on psychiatric nurses, all requirements have been expressed in terms of individuals. This was done because we were only able to obtain the breakdown between full-time and part-time psychiatric nurses in Alberta, and similar information for British Columbia, Manitoba and Saskatchewan was not available. It should be noted, however, that there are part-time psychiatric nursing positions in each province and the requirementss shown in this report may therefore be underestimating actual requirements.

Limitations of the Data

Difficulties were encountered because of the lack of a consistent, historical data base for the nursing occupations. The data base available on psychiatric nurses had serious limitations which made it difficult to make long-range projections with any degree of accuracy. In this report, projections have been made on both supply and requirement from 1981-2000. For planning purposes, however, it would be prudent to focus attention on the 1981-1985 timeframe, recognizing the difficulties associated with making informed judgements in light of the limited data base now available. The lack of consistency relates both to intraprovincial and interprovincial data. Both the method of data collection and the presentation of data differs among the provinces studied. In addition, in some provinces, the data collected by government agencies and professional associations is at variance.

The projections of manpower requirements contained in this report are extremely sensitive to the net occupational shift factor. There was no validated data available on which to base this key assumption. Therefore we

would caution the reader to take this into consideration prior to making any significant training decisions.

For a further discussion on the limitation of the data and the assumptions made, please refer to Appendix B.

REPORT FORMAT

A series of working papers specific to this occupation were prepared and submitted to the Steering Committee. These working papers included:

- preliminary findings regarding historical and projected supply and requirements;
- scope of existing training programs for psychiatric nurses in western Canada; and
- preliminary training recommendations.

The general background of the study on the psychiatric nurse occupation has been provided in this section of the report. Section II summarizes the projections of the future supply and requirement for psychiatric nurses in western Canada and the timing and location of these manpower requirements in each province.

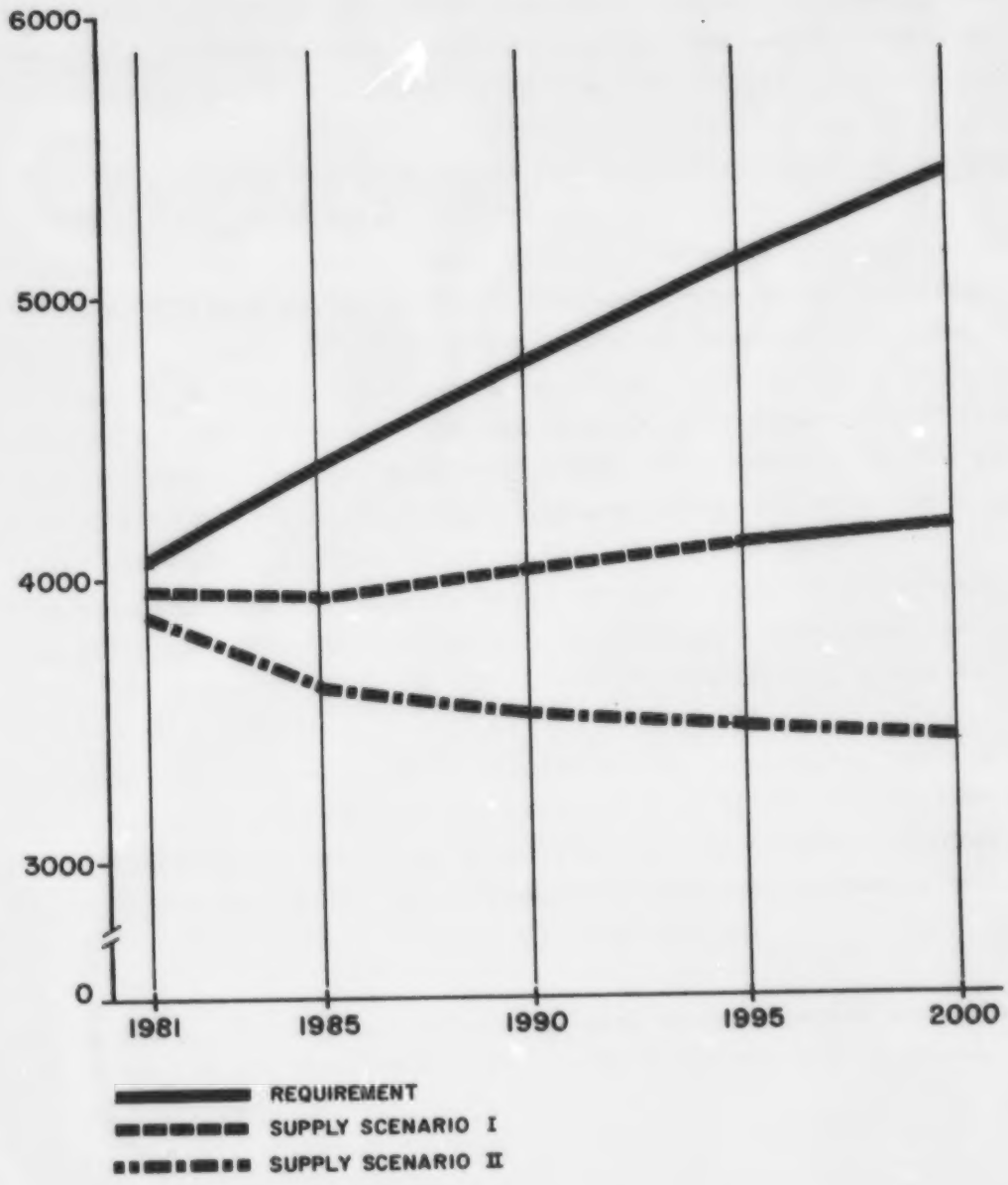
Section III examines present and future manpower strategies and the occupational issues impacting on the supply and requirement for psychiatric nurses. Three alternative strategies are assessed.

Section IV contains recommendations for this occupation. Three appendices provide further supporting detail as follows:

- Appendix A - Study Approach and Methodology
- Appendix B - Provincial Net Manpower Requirements
- Appendix C - Bibliography

EXHIBIT I

PROJECTED SUPPLY AND REQUIREMENT FOR PSYCHIATRIC NURSES IN THE WESTERN REGION



II - PROJECTED SUPPLY AND REQUIREMENT FOR PSYCHIATRIC NURSES IN THE WESTERN REGION

This section summarizes the projections of the supply and requirement for psychiatric nurses in the western region and the timing and location of these manpower requirements on a provincial basis. Further details of the methodology used and the assumptions made in developing the most likely supply and requirement projections for each province are contained in Appendices A and B.

WESTERN CANADA OVERVIEW

Exhibit 1, opposite, shows two projected supply scenarios and a projected requirement for psychiatric nurses in the western region from 1981-2000. The supply projection shown as Scenario I, in Exhibit 1, is based on a net occupational shift factor of -8% (or an average working life of 12 years). Scenario II is based on a net occupational shift factor of -10% (or an average working life of 10 years). The Exhibit indicates that under Scenario I the projected supply will increase from approximately 4,000 in 1981 to 4,200 in the year 2000. Under Scenario II, the projected supply will decrease from approximately 3,900 in 1981 to 3,400 in the year 2000. Over the same time frame, the requirement or demand will increase from approximately 4,100 in 1981 to 5,500 in the year 2000.

Based on these projections, the net requirement or shortage of psychiatric nurses will range from 100 to 200 in 1981 and increase to 1,300 to 2,000 by the year 2000. These two supply scenarios indicate the extreme sensitivity of the supply projections and net requirements to the net occupational shift factor.

The factors and the assumptions used to develop these projections are set out below.

Projected Supply

The projected supply scenarios shown in Exhibit 1 are based on an analysis of the output from a computer program used for this study.

The "opening stock" figure represented the number of active psychiatric nurses registered in each province. This figure was determined using data provided by respective psychiatric nurses' associations. The breakdown between full-time and part-time active psychiatric nurses was not obtainable for British Columbia, Saskatchewan or Manitoba. In Alberta, according to a survey done by government officials in March 1981, 11% of all practising psychiatric nurses were working on a part-time basis. Information regarding the degree of participation of part-time psychiatric nurses in the work force was unavailable. Consequently, the supply is based on the number of individuals, as opposed to the more desirable full-time equivalent data.

Based on the opening stock figure developed, the computer then added or subtracted a numerical or percentage value assigned to each of the following supply factors:

- net migration - defined as the movement of psychiatric nurses from one province to another province. Migration into each province was subtracted from migration out of that province to arrive at a net migration factor.

- net immigration - defined as the movement of psychiatric nurses from one country to another country. The number of emigrants from each province was subtracted from the number of immigrants to that province to arrive at a net immigration factor.

- training output (entry-level) - defined as the number of anticipated graduates from basic entry-level programs for psychiatric nurses in each province.

- training output (refresher level) - defined as the number of anticipated graduates from refresher level programs offered to

psychiatric nurses in each province. (Refresher outputs were not in the calculation as anticipated numbers were not provided).

- net occupational shift - defined as the net movement of psychiatric nurses from active to inactive status or from inactive to active status; movement into the profession from another profession or movement out of the active psychiatric nursing profession to another profession; and attrition due to death or retirement.

Values were assigned to each of these key factors based on historical trends revealed through analysis of the data from the respective psychiatric nurses' associations, interviews with association and government spokesmen and a review of literature and recent studies.

The percentage value used for the net occupational shift factor approximates an average working life of psychiatric nurses. For example, if the net occupational shift is assumed to be -8%, this would approximate a 12 year working life. If the net occupational shift factor is -10%, this approximates a 10 year working life. Specific research documenting the average working life of psychiatric nurses in the past was not available. It has been suggested that there may be a higher rate of dropout and career burnout of psychiatric nurses than other nursing occupations. Conversely, others have suggested that some members of the psychiatric nursing profession have a greater sense of commitment due to the team approach of health professionals to psychiatric care and thus the working life may be longer. In addition, it is recognized that a greater proportion of males, although declining in recent years, participate in the psychiatric nursing profession and this may contribute to a reduced occupational shift. However, following discussions with association representatives and employers of psychiatric nurses, it was believed that these factors balance one another out and that the average working life of psychiatric nurses may not significantly differ from registered nurses. Therefore, the factors developed for registered nurses were applied to psychiatric nurses.

Because of the lack of validated data with respect to the net occupational shift factor, a number of sensitivity analyses were undertaken to assess the

impact any percentage change would have on the future supply projections. Analyses were done using a net occupational shift factor of:

- -5% (20 year working life),
- -8% (12 year working life),
- -10% (10 year working life), and
- -12% (8 year working life).

Based on discussions with professional associations and psychiatric nursing employers, -8% and -10% net occupational shift were selected as a reasonable range on which to make supply projections. The supply projections are extremely sensitive to the net occupational shift factor and the lack of factual, validated information on this factor must be taken into consideration when examining the projected net requirements. It cannot be overemphasized that this key factor significantly impacts the projected supply scenarios.

The two supply projections, as shown in Exhibit 1, are as accurate as can be achieved in light of the lack of historical data and the key assumptions which have been used to project future supply. Because of the lack of a validated historical data base to develop these projections and the extreme sensitivity of the projections to the unvalidated assumptions made with respect to the net occupational shift factor, attention should be focused on the supply projections during the 1981-1985 timeframe.

Projected Requirement

Three methods of determining future requirement for health occupations in western Canada were considered for this study. These included:

- Service target method;
- Population ratio method;
- Service utilization method.

The methodology for each of these methods is set out in Appendix A. The service target method requires that a target ratio of psychiatric nurses to

population has been developed and agreed to by an occupation or government. As there are no defined service target ratios for psychiatric nurses in western Canada or elsewhere, this approach was not used.

The service utilization method requires that the number of psychiatric patients days and the number of full-time equivalent psychiatric nurses to meet this level of service are known. As discussed earlier, the number of full-time equivalent psychiatric nurses was not available. In addition, services for psychiatric patients are not delivered solely by psychiatric nurses, but rather in conjunction with registered nurses. Consequently, it was not possible to isolate the level of patient service delivered by the psychiatric nurse. Therefore, the service utilization method was not used.

The population ratio method examines the relationship between the population and the number of active practitioners. This method was used in projecting psychiatric nursing requirements, as it was the only data available. In projecting requirements using the population ratio method, a medium population growth was assumed. In addition some key assumptions in this method are that:

- the number of psychiatric nurses to the population in 1980 would be an acceptable level of service in future.
- there will be no major changes in technology or productivity which would impact on the future requirement for psychiatric nurses.
- there will be no major changes in the utilization of psychiatric nurses
- there will be no major changes in the delivery of psychiatric care.
- there will be no major change in the pattern of presentation or need for psychiatric care in the population.

The level of requirement shown assumes that the mix between psychiatric nurses, registered nurses, nursing assistants and other occupations would remain unchanged. If the delivery of psychiatric care moved towards the use of only registered nurses with specialized psychiatric training, the requirement for psychiatric nurses would significantly change. However, in making this statement, it is important to recognize that a number of psychiatric nurses also hold a registered nursing designation. A significant movement towards the expanded use of psychiatric nurses in other than institutional settings would impact on the level of requirement indicated in this report. There are indications of this trend in Manitoba, but it has not been possible to quantify the extent of additional future requirement.

Probably the most significant influence on future requirement which could not be measured in this report is the full-time equivalency factor. In Alberta, an estimated 11% of psychiatric nurses work part-time and this would significantly influence the net requirements for psychiatric nurses in this province. This report is based on individuals, as opposed to full-time equivalents and this fact alone may seriously be underestimating the projected supply and net requirements.

The requirement projection, as shown in Exhibit 1, is as accurate as can be achieved in light of the key assumptions which have been made. As in the projections of supply, it would be prudent to focus on the requirement projected over the 1981-1985 timeframe.

Net Requirement

The projected stock minus the projected requirement equals the net requirement for psychiatric nurses in the western region. Based on the foregoing analysis, the net requirement or shortage will be in the following range:

EXHIBIT 2

PROJECTED SUPPLY AND REQUIREMENT FOR PSYCHIATRIC NURSES

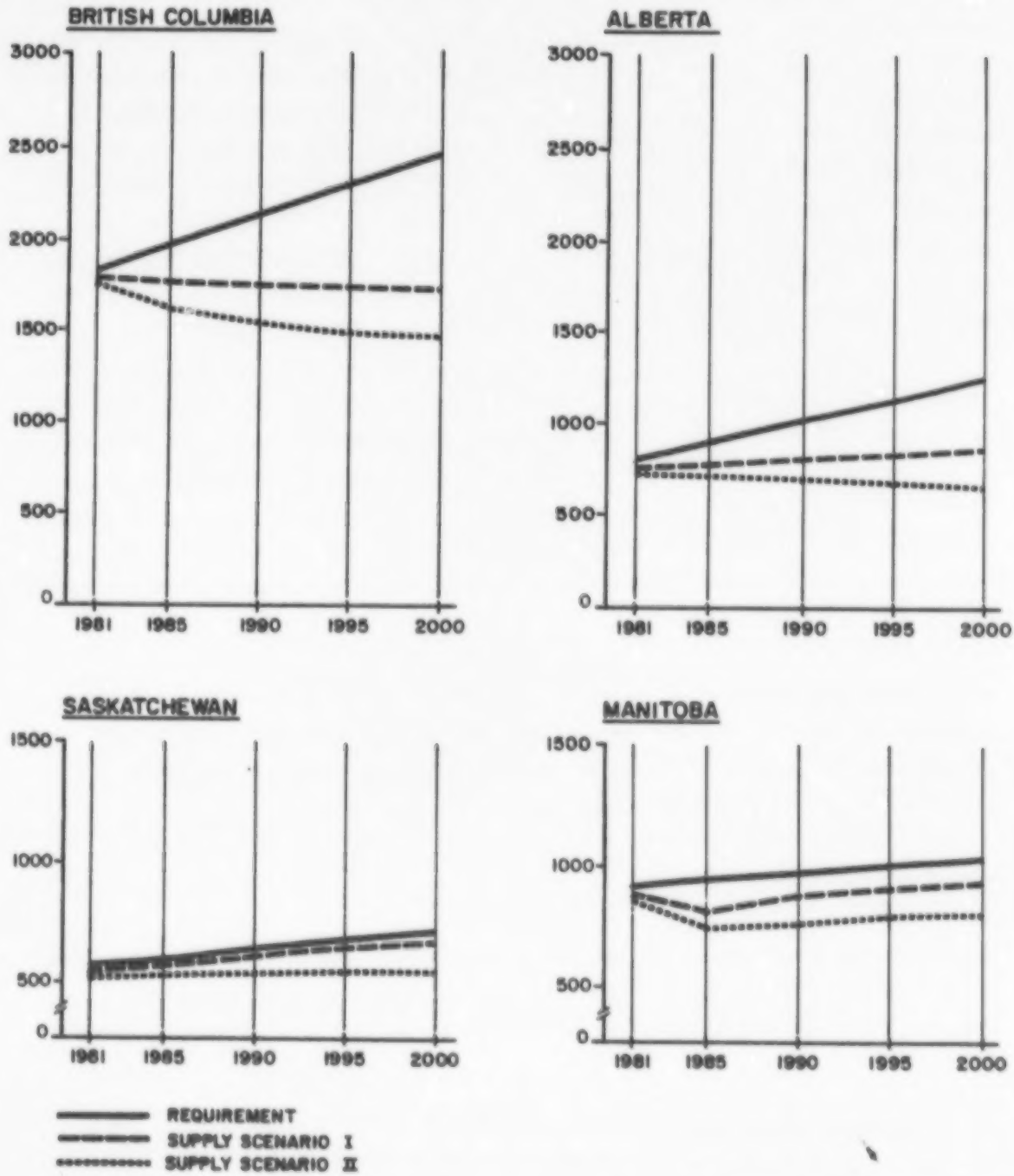


TABLE 1

PROJECTED NET REQUIREMENT FOR PSYCHIATRIC NURSES
IN WESTERN CANADA 1981 - 2000

Year	Scenario I Using the -8% occupational shift factor	Scenario II Using the -10% occupational shift factor
1981	100	200
1982	200	400
1983	300	500
1984	400	700
1985	500	800
1990	700	1,300
1995	1,000	1,700
2000	1,300	2,000

NOTE: Numbers have been rounded to the nearest hundred.

TIMING AND LOCATION OF MANPOWER REQUIREMENTS

In order to examine in more detail the timing and location of these projected shortages, projections of supply and requirement in each of the four western provinces have been set out in Exhibit 2, opposite. As in the previous Exhibit, two supply projections are shown. Scenario I assumes a -8% net occupational shift factor or an average working life of 12 years for each psychiatric nurse. Scenario II assumes a -10% net occupational shift or an average working life of 10 years.

British Columbia

In Scenario I, the graph indicates that British Columbia is presently experiencing only a very minor shortage of psychiatric nurses. Over the short term (1981 - 1985), this shortage will gradually increase. Over the longer term, however, there is a significant projected shortage. By the year 2000, there would be a shortage of approximately 700 psychiatric nurses. This represents approximately 30% of the requirements.

In Scenario II, British Columbia is presently experiencing a shortage of approximately 100 psychiatric nurses and this shortage is projected to grow annually. Over the short term, the projected shortage increases from

approximately 100 psychiatric nurses in 1981 to 300 in 1985. Under Scenario II, by the year 2000, there would be a projected shortage of approximately 1,000 psychiatric nurses.

The requirement projections reflect a moderate increase in population, and an unchanged ratio of professionals to population over the twenty year timeframe. The requirement increases from approximately 1,800 in 1981 to 2,500 in the year 2000. Under either supply scenario, however, the supply of psychiatric nurses is projected to decrease. British Columbia presently has a very small amount of net migration and net immigration of psychiatric nurses, and it was assumed that this historical trend would continue. As the graph indicates, British Columbia is facing a significant shortage of psychiatric nurses over the next twenty years.

Alberta

The requirement for psychiatric nurses in Alberta is projected to increase from 800 to 1,200 from 1981 to the year 2000, based on the anticipated growth in population over the next twenty years. Medium population growth projections were used to derive the requirement for psychiatric nurses. It is interesting to note that the number of psychiatric nurses in Alberta currently is approximately the same as in Manitoba.

In Scenario I, the graph indicates that Alberta is presently experiencing a balance in supply and requirements for psychiatric nurses, and only minor shortages (approximately 100) are projected over the 1981 to 1985 timeframe. These indicated minor shortages of psychiatric nurses, may be misleading. There are seasonal and geographical variations in the supply and requirement for psychiatric nurses and the projections shown may not reflect the actual shortages being experienced in specific settings. In particular, it is noted that Alberta Social Services and Community Health recently had to go to Britain to recruit psychiatric nurses.

In Scenario II, however, there is a shortage beginning in 1982 and this shortage would increase to approximately 200 in 1985. Under either Scenario, the province of Alberta would be facing a minor psychiatric nursing manpower

shortage in the short term, and this shortage would continue unabated to the year 2000 when there would a projected shortage of approximately 400 to 600 psychiatric nurses, or between 30 and 50 percent of the required supply. Based on these projections, Alberta would be facing a projected shortage only slightly less severe than that faced by British Columbia over the same timeframe.

Saskatchewan

The level of projected requirement and projected supply scenarios for psychiatric nurses in Saskatchewan over the next twenty years increases only very moderately, and throughout the twenty year period there is only gradual change. As in the other nursing professions, Saskatchewan has a negative net migration factor, and no immigration of psychiatric nurses is projected.

In Scenario I, Saskatchewan is presently experiencing a balanced manpower situation and this continues from 1981 to the year 2000.

In Scenario II, however, there is a minor shortage beginning in 1983. The shortage gradually increases to approximately 200 by the year 2000. This projected shortage represents approximately 25 percent of the required supply for the same year and is therefore considered significant.

Manitoba

Similar to Saskatchewan, the projected requirement for Manitoba increases at a moderate level over the next twenty years.

In Scenario I, the graph indicates that Manitoba is currently experiencing a minor shortage in the supply of psychiatric nurses and this shortage continues to the year 2000 at approximately 100 throughout the forecast period. Manitoba experienced low levels of entry training output in recent years and is slowly attempting to increase the number of outputs over the 1981-1987 period. These gradual increases in the supply, however, are somewhat negated by the net occupational shift factor.

In Scenario II, Manitoba would be experiencing even greater shortages of psychiatric nurses. The shortage remains relatively stable from 1985 to the year 2000 at approximately 200 individuals, or 20 percent of the required supply.

SUMMARY

Based on the projected supply scenarios and projected requirement shown in Exhibit 2, the net requirement for psychiatric nurses in each province is as follows:

TABLE 2
PROJECTED NET REQUIREMENT FOR PSYCHIATRIC NURSES

	British Columbia		Alberta		Saskatchewan		Manitoba	
	Scenario I	Scenario II	Scenario I	Scenario II	Scenario I	Scenario II	Scenario I	Scenario II
1981	0	100	0	0	0	0	100	100
1982	100	100	0	100	0	0	100	100
1983	100	200	100	100	0	100	100	200
1984	200	300	100	100	0	100	100	200
1985	200	300	100	200	0	100	100	200
1990	400	600	200	300	0	100	100	200
1995	600	800	300	500	0	100	100	200
2000	700	1,000	400	600	100	200	100	200

NOTE: Numbers have been rounded to the nearest hundred.

With the exception of the projected shortages in British Columbia and Alberta, this level of projected net requirement for psychiatric nurses may not appear significant on first consideration. However, it is important to recognize that these projections are based on individuals, as opposed to full-time equivalents. If a significant proportion of the psychiatric nursing profession currently, or in future, work on a part-time basis, the impact on requirements will be great. In addition, it is important to view the net requirements as a proportion of the total supply of psychiatric nurses required. For example, under Scenario II in British Columbia, the requirement for 300 additional psychiatric nurses in 1985 may not seem to be a substantial

shortage. However, when compared to the supply requirements, it represents approximately 17% of the supply which is relatively significant.

It must be recognized, however, that these projections have been developed using a limited data base and that the two supply projections represent what we believe is a "best guess" without any hard, factual evidence to support the key net occupational shift assumption. As indicated earlier, the requirement projection has been made without the benefit of a detailed assessment of how impending changes in the delivery of nursing care would impact upon requirements and we have been unable to validate whether the level of requirement indicated will materialize at the precise timeframes indicated. We would, therefore, caution the reader of this report to focus on the projections indicated during the 1981-1985 timeframe and to exercise caution in interpreting the shortages projected. The projections shown in 1981 may not be readily compared with vacancy surveys undertaken in various provinces during the year and this will be discussed in more detail in Appendix B.

In the following sections, the present and alternative strategies required to address the projected shortage over the short term, 1981 to 1985, are examined.

III - PRESENT AND FUTURE MANPOWER STRATEGIES

This section examines the major factors influencing the present and future supply of psychiatric nurses in the western region. These factors are discussed under the headings of training programs and occupational issues. The latter encompasses those issues which may influence decisions by psychiatric nurses to leave or to re-enter the work force and decisions by potential candidates to enter training programs. Finally, the impact of three alternative strategies to address the projected shortage over the next 5 years are assessed.

EXISTING TRAINING PROGRAMS

Each of the four western provinces currently provide entry level educational programs for registered psychiatric nurses. It should be recognized that there are other provinces in Canada, where similar programs are not provided and psychiatric nursing care is provided with alternative nursing personnel. A significant factor affecting the future requirement for registered psychiatric nurses is the resolution of the role function of the profession in the health care delivery system and the method of providing psychiatric nursing care. As no legislated changes have been made, or appear to be forth coming in the near future, regarding the psychiatric nursing profession, this report assumes that the historical role of the psychiatric nurse will continue. In addition, although this report outlines training recommendations addressing the numbers of outputs required, it does not address the training mechanism to be utilized in the provision of psychiatric nurses.

Increasing the number of graduates from training programs is a traditional method of increasing the supply of psychiatric nurses. It is unlikely that this approach will be as successful in the future as it has been in the past. This section summarizes the review of existing training programs for psychiatric nurses in the western region. (For a more detailed discussion of these training programs please refer to the report "The Scope of Existing Training Programs - Category 4 Occupations".)

EXHIBIT 3

TRAINING PROGRAM OUTPUT OF PSYCHIATRIC NURSES IN WESTERN REGION IN 1981

Basic Training	British Columbia	Alberta	Saskatchewan	Manitoba	Western Region Total
Hospital Based (2 years)	—	40 (2)	—	40 (3)	80
Community College (2 years)	125 (2)*	—	50 (1)	—	175
TOTAL	125	40	50	40	255

* Numbers in brackets indicate the number of training programs.

Exhibit 3, opposite, shows the anticipated or planned output of graduates from basic or entry level training programs in each province in 1981. This level of output is expected to remain relatively constant over the next 5 years. The only planned change in output is in Saskatchewan where anticipated outputs are projected to increase from 52 to 70 in 1982, 73 in 1983, and 75 from 1984 to the year 2000. In Manitoba, the actual output of graduates in 1981 was 40. This will increase to 48 in 1982, 57 in 1983, 65 in 1984, 75 in 1985, 86 in 1986, and 90 in 1987 through to the year 2000. Exhibit 3 indicates that Alberta anticipated 40 graduates, but the actual number of graduates in 1981 was closer to 45.

Basic Training

Basic training (or entry-level training) is provided at two settings with lengths of programs ranging from twenty-two months to twenty-four months. The total enrollment quotas have remained relatively stable over the last decade. It is unknown whether the number of applicants to these programs has changed, however, it is thought that there has been a slight decrease in the last five years. The number of students accepted into the programs has been relatively stable, however, in some cases enrollment quotas are not being filled and this may be due to the lack of qualified applicants. The number of graduates out of these programs ranges from 10% to 60% less than enrollment figures with attrition rates varying between each setting and individual educational institutions. The overall attrition rate considering all enrollments and all graduates is approximately 35%.

Upgrading

Saskatchewan has a bridging program for nursing assistants to become registered psychiatric nurses. Alberta has had a pilot program at Mount Royal College since 1980 to provide post-basic mental health nursing to registered nurses. In British Columbia there has been discussion concerning the admission of partial program students (e.g., licensed nursing assistant partial program students wishing to qualify as psychiatric nurses). To our knowledge, no similar upgrading programs exist in Manitoba.

As indicated earlier, there is a projected shortage of nursing assistants and registered nurses and any significant provision of upgrading programs to a psychiatric nurse level would increase the size of the projected shortages in these other nursing occupations.

Refresher

Refresher training is currently provided for psychiatric nurses in Alberta. A recent report has indicated a commitment by government authorities in Saskatchewan to develop a refresher course for psychiatric nurses.

OCCUPATIONAL ISSUES

Many of the occupational issues affecting the present and future supply and requirement for psychiatric nurses in the western region parallel those facing the nursing profession as a whole. There has been little or no research done on the occupational issues facing psychiatric nurses specifically. However, the most significant issue currently facing the psychiatric nursing profession specifically is the future of this profession and alternative training to meet psychiatric nursing requirements. It is believed that the remaining issues facing the psychiatric nursing profession are the same as those facing registered nurses. These issues will have a severe impact on future manpower planning strategies for the nursing occupations. In the following sections, the major nursing occupational issues influencing each of the following are discussed:

- retention of the current supply of active psychiatric nurses;
- recruitment of inactive psychiatric nurses back into the active workforce;
- recruitment of students into training programs for psychiatric nurses; and
- requirement for and future utilization of psychiatric nurses.

Retention of Current Supply

The retention issue applies to both retention of existing supply in the nursing profession and retention of psychiatric nurses in employment settings.

The average working life of a nurse is relatively short. Based on the review of literature and interviews with professional associations, it is estimated that the average working life of a psychiatric nurse is similar to that of a registered nurse and is between 10 and 12 years. There is no factual information to support this assumption. It has been suggested, however that the average working life of a psychiatric nurse may be shorter than that of a registered nurse because of the suggested high "burn out" rate of psychiatric nurses. On the other hand, because more males participate in this occupation, it has been suggested that the average working life may be longer than that of registered nurses. It has also been suggested that registered psychiatric nurses are to some extent "locked in" to psychiatry and that this may result in a longer average working life. All of these arguments provide some indications that psychiatric nurses may be different from registered nurses, but there is no factual evidence or research available to quantify the extent or magnitude of these differences. The rate of participation of nurses in the workforce is believed to be lower than other female dominated occupations (such as teaching). Reports issued in two western provinces indicate that inactive psychiatric nurses represent 20% to 30% of the total potential supply of trained psychiatric nurses. Therefore, there may not be a shortage of trained psychiatric nurses, but rather a shortage of psychiatric nurses willing to participate in the work force. This situation would most likely apply to the total western region.

There is a high turnover rate among nurses in institutional settings. It is believed that the factors affecting the retention of nurses in both the profession and in particular positions or employment sectors fall into four major categories:

- <u>educational factors</u> including:

  - the educational experiences which affect the nurse's job expectations;
  - factors affecting the relationship between education and practice of nursing; and
  - the availability and accessibility of on-going education.

- <u>organizational practices and human resource management factors</u> which affect the nature of nursing jobs including the opportunity to:

  - employ a full range of skills;
  - undertake whole or meaningful components of patient care;
  - use discretion in work methods;
  - receive adequate feedback;
  - experience professional growth; and
  - realize career mobility.

- <u>employment factors</u> which affect working conditions including:

  - compensation and benefits
  - scheduling and rotation;
  - transportation;
  - work place amenities, etc.

- <u>social and economic factors</u> including:

  - family responsibilities;
  - mobility of spouses;
  - role of women;
  - interest rates;
  - unemployment rates; and
  - consumer price index.

Employment factors and social and economic factors have thus far been the primary focus of attempts to increase the retention of psychiatric nurses in the workforce. It is now believed, however, that future retention and recruitment strategies should attempt to address the educational and organization and human resources management factors.

Historical trends of migration and immigration of nurses in western Canada may change in the future. The North American nursing labour pool is relatively mobile and shortages of nurses are projected in other parts of the country. Recruitment or retention strategies developed and implemented in eastern Canada or in the United States may have a more severe impact on the retention of the current or future supply of active nurses in western Canada than in the past.

Career choices available to women have significantly expanded in recent years. Thus the retention of the current supply of female psychiatric nurses is more difficult and many psychiatric nurses may be leaving their current employment settings and also leaving the profession. It has been suggested that there is a high "burn out" rate of psychiatric nurses in institutional settings and that this may in fact force a mid-stream career change. Some have suggested that psychiatric nurses have difficulty in finding suitable employment in less stressful environments (such as psychiatric wards of general hospitals) and that shifts out of psychiatric institutions effectively result in occupational shift out of the nursing professions.

Recruitment of Inactive Nurses

It is believed that there are a large number of inactive psychiatric nurses who might conceivably be attracted to re-enter the active workforce. The size, age structure or geographic location of this inactive labour pool is unknown. The likelihood of this group returning in significant numbers on a full-time or part-time basis is also unknown. Recent experience with refresher programs in western Canada indicates that re-entry to the active workforce by registered nurses is primarily on a part-time basis, and the

experience with refresher graduates in psychiatric nursing is unknown. Attempts to recruit large numbers of inactive nurses into the active workforce in the United States have not proven as effective as was earlier hoped. The success of employers in retaining nurses who have recently re-entered the active workforce for significant periods of time has not been sufficiently studied. It is believed, however, that the retention rate is poor and that this situation would also apply to psychiatric nurses.

It appears that successful re-entry to the active workforce is somewhat linked to the availability and accessibility of refresher training that allows a nurse to gain confidence in his/her abilities and competence prior to returning to the workforce. Refresher training programs are currently available for psychiatric nurses in Alberta and a recent report indicates a commitment by government authorities in Saskatchewan to develop refresher programs for this profession. Refresher training programs are not available in British Columbia or Manitoba.

Recruitment of Students into Training Programs

The attrition rates from nursing education programs, and the experience of some colleges in which educational positions remain vacant due to a lack of qualified applicants, suggests that recruitment into the profession is now, or will be in the future, a significant problem.

The image of nursing as a profession may in future impede the recruitment of qualified high school graduates into entry-level training programs. It has been suggested that nurses view nursing as a series of episodic jobs rather than as a career, and this image of the profession may make it less appealing to career-oriented young women in the future and may also reduce the likelihood of recruiting proportionately more males into the profession. Approximately 30% to 38% of the psychiatric nurses in western Canada are male and in Alberta the proportion of males has been declining in recent years. In 1970, 45% of all psychiatric nurses in Alberta were male; in 1980, only 31% of all Psychiatric Nurses Association of Alberta registrants were male.

The viability of the psychiatric nurse profession is a major occupational issue. It has been suggested , for example, that the psychiatric nursing profession could be eliminated in future and that registered nurses with specialized training in psychiatry could meet the requirement. It is difficult to assess the likelihood of this happening in the short term in western Canada in light of the projected shortages of registered nurses documented in a separate report. The psychiatric nursing profession may not presently have an image which would facilitate the movement of a large number of registered nurses into specialist training programs in psychiatry. This study precluded an examination of the viability of the profession and a more detailed assessment of the overall viability of the profession would need to be undertaken to assess this specific question in depth. Of significant concern at this point in time is whether in fact there is an opportunity to replace psychiatric nurses with registered nurses with psychiatric training, particularly in light of the projected shortage of registered nurses.

Requirement for Psychiatric Nurses

The requirement for psychiatric nurses may be significantly greater than anticipated if a large proportion of this professional group work on a part-time basis. The projections in this report are based on individuals, as opposed to the more desirable full-time equivalent basis.

The utilization of the psychiatric nurse in psychiatric settings was assumed to remain constant. However, it should be recognized that the further development of registered nursing specialist positions in psychiatry and the availability of specialist training programs in the future, could significantly reduce the requirement for psychiatric nurses. Any reduced utilization of psychiatric nurses will further impact on the projected shortage of registered nurses which has been documented in a separate report.

There have been in the past, and will likely be in the future, rural and urban differences, north and south differences and seasonal variations in the

availability and shortage of nurses. This study has assessed the general requirement for psychiatric nurses in western Canada based on present levels of practice. It is recognized, however, that there is a need to develop mechanisms whereby the geographic and seasonal variations in shortages and availability of psychiatric nurses could be closely monitored.

Generally there is little factual information available on which to assess the longer-term requirement for psychiatric nurses, and even in the shorter term it is difficult to develop accurate projections with a high degree of confidence. The knowledge and skill base requirements of psychiatric nurses have significantly changed over the last decade and there are emerging changes within the nursing professions which will impact on future levels of requirement. There is little quantitative information available on which to assess how changes in nursing practice, changes in technology, changes in productivity, and changes in the overall delivery of psychiatric health care have affected the requirement for pyschiatric nurses over the past decade. Unfortunately, this lack of historical data hampers the ability of researchers to conduct a quantitative assessment of how much of an impact any future changes in the nursing occupations will have on projected requirements for psychiatric nurses.

ALTERNATIVE MANPOWER STRATEGIES

The preceding discussion has indicated that there is a projected shortage of active psychiatric nurses in the western region and that there are significant occupational issues affecting the recruitment and retention of nurses. In the following sections three alternative strategies for addressing this projected shortage are examined:

Strategy A - Increase training outputs to meet projected shortages.

Strategy B - Develop and implement retention and recruitment strategies to reduce the net occupational shift.

Strategy C - Increase training outputs and develop and implement retention and recruitment strategies to reduce the net occupational shift.

Strategy A - Increase Training Outputs

Some of the traditional approaches used to meet projected shortages of manpower requirements are to increase the size or number of training programs, reduce their length, or reduce their attrition rates. Other approaches might include changing the entrance requirements to training programs to facilitate the acceptance of larger numbers of candidates.

As indicated previously, large increases in training output may not be feasible in light of recent decline in enrollments for entry-level training. The skills required by psychiatric nurses are becoming increasingly complex, and it is unlikely that the length of entry-level training programs could be reduced, particularly in light of the recent suggestion that a baccalaureate degree program be established for psychiatric nurses. Similarly, reducing the entrance requirements to training programs is unlikely to be practical or effective.

In developing Strategy A, a one-third increase over the planned level of entry-level outputs was selected as being a reasonable target to be achieved in the longer term. A western region increase of training outputs by one-third assumes that:

1. The present level of attrition out of training programs (ranging from 10%-60%) could be reduced.

2. Programs could be made attractive enough to qualified applicants so that there would be an increase in applications and an increase in the number of students accepted into existing training programs.

3. Existing training programs could be expanded in the Fall of 1982 to accommodate a moderate increase in students or that new programs, if required, could be set-up by the Fall 1982.

Short and longer term strategies to reduce attrition, to increase applications by qualified applicants and to eventually effect an increase in training outputs would need to be developed and implemented in order to achieve this approach. Issues to be addressed prior to implementing this strategy would include:

- improving the image of psychiatric nursing as a profession;

- developing and maintaining appropriate entrance requirements into nursing education programs;

- attracting both men and women into the profession;
- providing appropriate support/guidance to nursing students to ensure that students with demonstrated ability and skill remain in the programs until graduation;
- examining the factors affecting the relationship between education and practice of nursing; and
- examining the educational experiences which effect the nurse's job expectations.

Strategy A examined the required number of entry-level outputs in each province in 1984 in order to meet projected shortages in each province. The following increases in 1984 training output were used:

TABLE 3

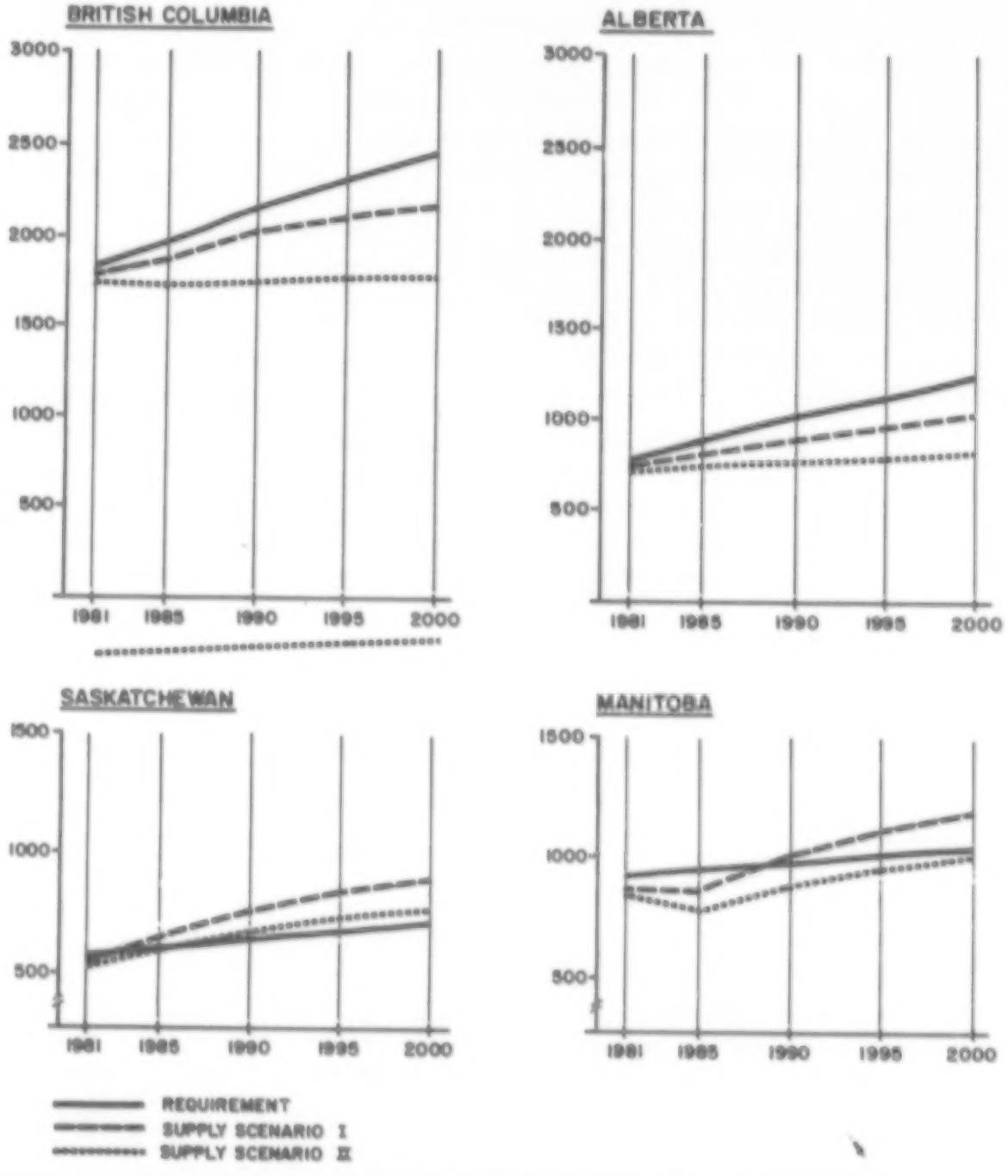
PRESENT AND PLANNED ENTRY LEVEL OF TRAINING OUTPUTS IN THE WESTERN REGION

	Outputs Anticipated (1984)	Strategy A Suggested Number of Entry-Level Outputs (1984)
British Columbia	125	165 (32% increase)
Alberta	40	55 (37% increase)
Saskatchewan	75	100 (33% increase)
Manitoba	65	84 (29% increase)
Western Region Total	305	404 (32% increase)

The entry-level outputs anticipated in 1984 shown in Table 3 are based on the information contained in the Training Programs for Psychiatric Nurses report issued earlier in the study, and amended to reflect updated information provided by Manitoba in February 1982.

EXHIBIT 4

EFFECT OF IMPLEMENTING STRATEGY A ON THE PROJECTED SUPPLY AND REQUIREMENT FOR PSYCHIATRIC NURSES



The increase in Alberta of 37% may be somewhat misleading, as recent updated information indicated that closer to 45 students graduated in 1981 and it is hoped that this level or a slightly increased one will be maintained from 1982-1984.

Exhibit 4, opposite, shows the effect of increasing training outputs by the percentage amounts indicated throughout the period 1984 to the year 2000.

Small increases in enrollments would be needed to reach the entry-level outputs suggested in Strategy A if current attrition rates out of these programs could be reduced. If attrition rates remain unchanged, however, the number of enrollments would have to be significantly increased. For example, Alberta currently has 90 entry-level enrollments and anticipates training outputs of 45 psychiatric nurses. Strategy A suggests that Alberta's training outputs be increased to 55 in 1984. If attrition could be reduced from the current level of 50%, to a level of approximately 40%, Alberta could achieve the training outputs suggested in Strategy A without increasing enrollments. If attrition rates were unchanged, the number of enrollments would have to be increased from 90 to 110 in order to achieve Strategy A. This suggests that a serious examination of factors contributing to attrition should be undertaken in the near future.

If the occupational shift is now -8%, Strategy A would meet the requirements for Saskatchewan with surpluses reaching nearly 25% by the year 2000. In the case of British Columbia and Alberta, Strategy A would be an inadequate response and there would still be manpower shortages of approximately 10% to 1990. Thereafter, shortages would gradually increase to 13 and 18 percent for British Columbia and Alberta respectively, by the year 2000. Manitoba would experience shortages until 1990 and thereafter would have a surplus. The western region as a whole would experience a surplus by 1990 with only very minor shortages thereafter. As indicated earlier, however, this fairly optimistic projection should be viewed with some caution as these requirements and supply scenarios are based on individuals, as opposed to full-time equivalents. If a significant proportion of psychiatric nurses work on a part-time basis, there would be much larger shortages.

If the occupational shift is now -10%, Strategy A would result in an almost balanced situation in Saskatchewan. In the case of British Columbia and Alberta, Strategy A would not meet projected requirements. Shortages in the range of 10% to 20% would occur in 1985, growing to 30% to 35% by the year 2000 in British Columbia and Alberta. Manitoba would experience decreasing shortages from 1985 onwards. Western region requirements would not be met, with shortages of approximately 10% until 1990. Thereafter, the shortages are projected to increase.

In summary, it would appear that this traditional approach would be an inadequate response for the western region as it would not meet projected shortages of psychiatric nurses in each province in the period 1981 - 1985. A strategy of increasing training outputs, without addressing the problems of retention and recruitment facing this profession, would be an inefficient and ineffective response to the projected shortage.

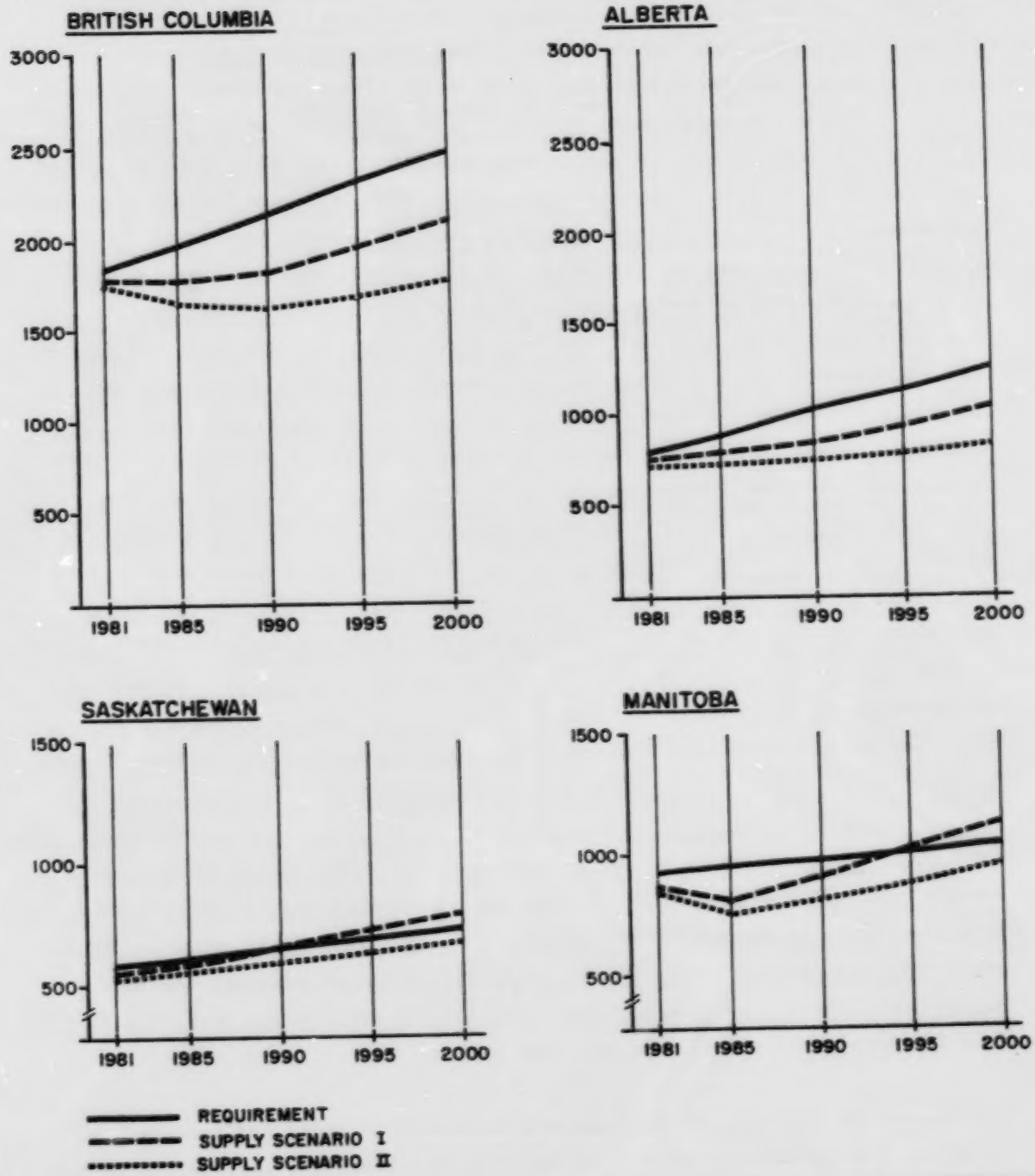
Strategy B - Retention and Recruitment

Recent efforts in manpower planning for the nursing professions in other regions have been directed towards the development and implementation of retention and recruitment strategies. Most of these efforts have centered on addressing employment, social and economic factors through such measures as increasing salaries, improving benefit packages, offering child day care centers, varying nurse scheduling approaches, etcetera. Some aggressive recruitment strategies have been designed to attract active nurses from other provinces or other countries to a particular employment setting or geographic location. Other strategies have been designed to attract inactive nurses back into the workforce. The effect of these types of retention and recruitment strategies on manpower planning efforts has not been studied sufficiently to ascertain their effectiveness or efficiency. Recent studies in the United States suggest that short-term strategies concentrating on employment, social and economic factors have not been particularly successful.

It is now believed that manpower strategies for the nursing profession should focus on addressing the educational and organizational practice factors (as

EXHIBIT 5

EFFECT OF IMPLEMENTING STRATEGY B ON THE PROJECTED SUPPLY AND REQUIREMENT FOR PSYCHIATRIC NURSES



discussed on page III-5) affecting retention and recruitment. The educational factors include an examination of how the educational experience affects the nurse's job expectations, the factors affecting the relationship between education and the practice of nursing and the availability and accessibility of on-going educational opportunities. The organizational practices and human resource management factors include those which affect the nature of nursing jobs, including the opportunity to employ a full range of skills, experience professional growth, realize career mobility, etcetera. This study precluded an in-depth analysis of the retention and recruitment issues impacting on the projected supply of psychiatric nurses in western Canada, however it is generally believed that an examination of the educational and organization practices affecting retention and recruitment is required. These factors are the least recognized, most difficult and potentially the most fruitful factors to be addressed from a manpower planning standpoint. Both short-term and long-term retention and recruitment targets need to be developed. For example, a reasonable target for the western region could be that psychiatric nurses would have an average working life of 15 - 20 years and would stay in each employment setting for 3 years or longer. It is believed that it would be possible to reduce the net occupational shift factor from its present high level down to a more acceptable level, and that this could be accomplished over an extended period of time. The objective of this strategy would be to eventually stabilize this factor, and reduce the cyclical periods of surplus or shortages in the nursing profession. However, it should be noted that there may be an irreducible minimum below which turnover and attrition cannot be reduced.

Exhibit 5, opposite, shows the effect of gradually reducing the net occupational shift from -8% to -5% over the next twenty years. This would have the effect of increasing the average working life from 12 years to 20 years over this period. Scenario II shows the effect of reducing the net occupational shift from -10% to -6% (or increasing the average working life from 10 years to 15 years) over the same period.

The assumption implicit in this approach is that both short and long term retention and recruitment strategies would be developed and implemented by the

western region which would bring about this change. It may be possible to effect change more rapidly, but on balance it is believed that the targets shown in Strategy B are reasonable given the extent of the occupational issues facing the nursing profession.

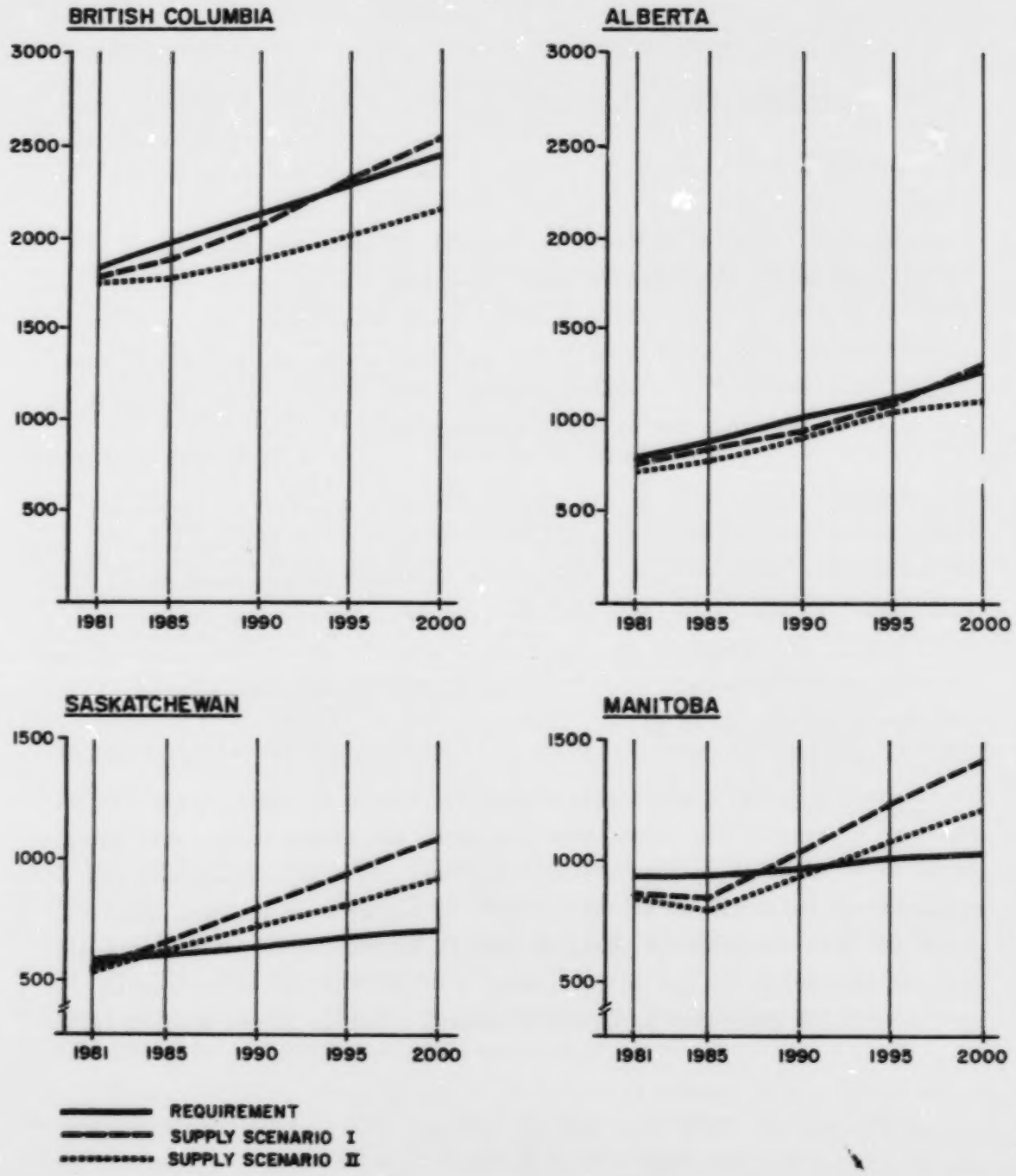
If the occupational shift is now -8%, as shown in Exhibit 5, this strategy would result in a balanced situation in Saskatchewan by 1990 and could result in a 10% surplus of psychiatric nurses by the year 2000 (assuming that training outputs were held constant). Strategy B would, however, be inadequate for Alberta, Manitoba and British Columbia and there would be continued manpower shortages in these provinces. In Manitoba, by 1995 there would be a minor surplus. This strategy would reduce these shortages in Alberta and British Columbia to levels ranging between 10% and 20% of total supply requirements. On a western region basis, Strategy B would result in shortages of less than 10% of total requirements.

If the occupational shift is now -10%, Strategy B would be an inadequate response for British Columbia and Alberta with manpower shortages in the range of 20% to 30%. Manitoba would experience shortages in the short term, which would start to reduce in 1985. By the year 2000, Manitoba would face shortages of approximately 7%. Strategy B would result in shortages of less than 10% in Saskatchewan. With Strategy B, the western region would experience significantly greater shortages.

In summary, Strategy B would have a positive effect on reducing the projected shortage of psychiatric nurses over the short and longer term. This strategy would be an adequate response for Saskatchewan and Manitoba, whether the occupational shift is now at -8% or -10%. Strategy B on its own, however, would not meet the manpower needs of Alberta or British Columbia in the short term or long term. On balance, Strategy B alone would be an inadequate response to the projected psychiatric nursing shortage in the western region.

EXHIBIT 6

EFFECT OF IMPLEMENTING STRATEGY C ON THE PROJECTED SUPPLY AND REQUIREMENT FOR PSYCHIATRIC NURSES



Strategy C - Increase Training Outputs and
Develop Retention and Recruitment Strategies

Strategy C consists of a combination of Strategies A and B. Exhibit 6, opposite, shows the effect of increasing entry-level training outputs by approximately one-third and reducing the net occupational shift from -8% to -5% (Scenario I) or from -10% to -6% (Scenario II).

The rationale behind this manpower strategy is that the projected shortages of psychiatric nurses necessitates approaches which would more rapidly bring about a balanced manpower situation.

Prolonged shortages of psychiatric nurses would not likely be tolerable in any of the provinces, and it is believed that shortages in employment settings contribute to greater shortages in the longer term. Shortages in the 1981-1985 timeframe could, therefore, adversely affect any attempts at recruitment into the profession or retention of existing supply, and could also increase the requirement for other types of nursing personnel (such as registered nurse, nursing assistants, etc.) which are already facing manpower shortages. The priorities in Strategy C should be as follows:

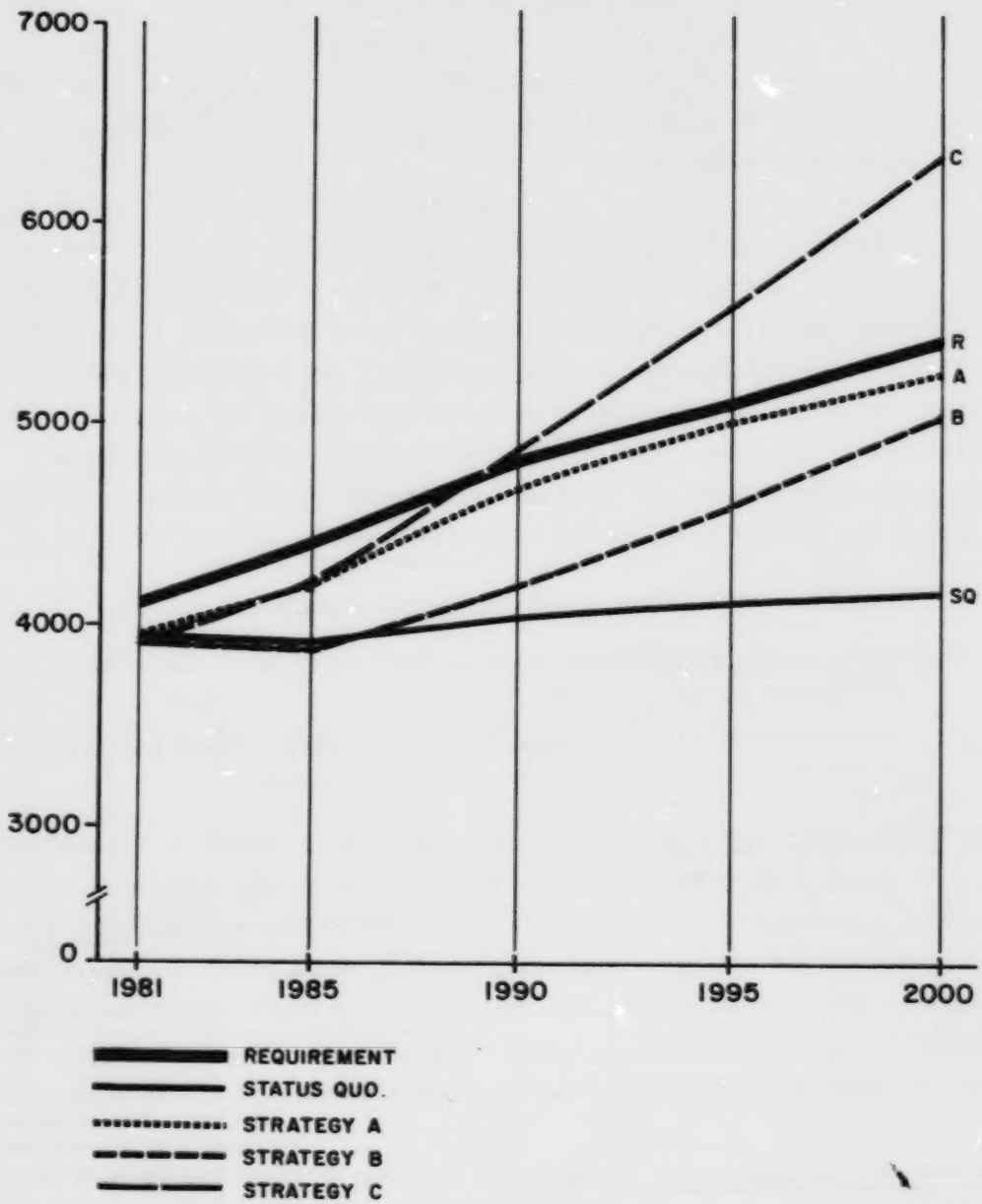
1. Retention of existing supply of active psychiatric nurses.
2. Recruitment of qualified students into entry-level training programs.
3. Recruitment of inactive registered psychiatric nurses back into the active workforce and their subsequent retention.

If the occupational shift is now -8%, Strategy C would result in a relatively balanced situation in Saskatchewan by 1985 with significant surpluses thereafter. Strategy C would result in a relatively balanced situation in British Columbia and Alberta. Manitoba, however, would still experience small shortages in the 1981-1985 timeframe, and thereafter would experience large surpluses. The western region would be in balance by 1990 with gradually increasing surpluses thereafter, reaching approximately 15% by the year 2000.

If the net occupational shift is now -10%, Strategy C would result in a balanced situation in Saskatchewan by 1985, with surpluses thereafter. British Columbia and Alberta would continue to experience shortages of between 10% to 20% of total supply requirements to 1985. Manitoba would experience

EXHIBIT 7

EFFECT OF VARIOUS ALTERNATIVE STRATEGIES ON THE PROJECTED SUPPLY AND REQUIREMENT FOR PSYCHIATRIC NURSES IN THE WESTERN REGION



shortages until 1995, and would then have a surplus. The requirements of the western region, as a whole, could be almost in balance by the year 2000 with shortages of 100.

Summary

In this section, the present and alternative future manpower strategies to address the projected shortage of registered psychiatric nurses in western Canada have been examined. Exhibit 7, opposite, shows the effect of each of the alternative strategies on the projected supply of registered psychiatric nurses in the western region from 1981 to 2000. Alternative strategies would have the following effect on net requirements for the western region:

TABLE 4
NET REQUIREMENTS FOR PSYCHIATRIC NURSES IN WESTERN CANADA

	Status Quo		Strategy A		Strategy B		Strategy C	
	Scenario I	Scenario II	Scenario I	Scenario II	Scenario I	Scenario II	Scenario I	Scenario II
1981	100	200	100	200	100	200	100	200
1982	200	400	200	100	300	400	300	400
1983	300	500	200	400	400	500	300	500
1984	400	700	200	400	400	600	300	500
1985	500	800	200	500	500	700	200	500
1990	700	1,300	100	600	600	1,000	-100	400
1995	1,000	1,700	100	500	500	1,200	-500	300
2000	1,300	2,000	200	400	400	1,200	-900	100

NOTE: Numbers have been rounded to the nearest hundred. A minus sign indicates a surplus.

The significant occupational issues presently affecting the supply of registered psychiatric nurses require that future manpower strategies must focus on efforts to increase the retention and recruitment of psychiatric nurses. A western region approach to this projected shortage should be developed so that future efforts can be closely monitored and evaluated on a co-ordinated basis. There is a pressing need for the development of a consistent and accurate data base on which to make informed manpower planning decisions.

IV - RECOMMENDATIONS

INTRODUCTION

Recommendations with respect to manpower strategies to address the current and projected shortage of registered psychiatric nurses in the western region are set out below. They are followed by recommendations for each of the four provinces. These recommendations focus on action to be taken during the 1981-1985 timeframe and reflect the significant concerns expressed in this report about the limitation of the data used and the assumptions made to develop the projections of both supply and requirement.

WESTERN REGION RECOMMENDATIONS

There are several approaches to health manpower planning which would best be undertaken by the western region.

Development of a Manpower Planning Data Base

Previous approaches to manpower planning for nurses have been undertaken independently by each western province. Manpower planners and respective professional associations in each province collect and analyze data on nurses in a different manner, making it difficult to accurately assess the historical trends of factors affecting supply. Similarly, the lack of a consistent historical data base on the requirement for nurses limits the ability of manpower planners to make informed decisions on the likely range of future requirements or to assess the effect of various manpower planning strategies implemented.

RECOMMENDATION #1.

The western region should develop an information base for psychiatric nurses to provide consistent, timely and accurate data with respect to

this occupation. Priority attention should be focussed on developing an information base to include:

- uniform definitions of active and inactive psychiatric nurses.
- a methodology for accurately measuring the occupational shift factor including the movement of registered psychiatric nurses from active to inactive status, movement in and out of the nursing profession, and attrition due to death or retirement.
- a methodology for monitoring and accurately assessing the migration of registered psychiatric nurses in and out of each province and for monitoring the immigration and emigration of registered psychiatric nurses.
- uniform definitions of part-time and casual workers and accurate measurements of the average number of hours worked by each of these groups.
- development of other information bases which would assist in validating trends in employment of registered psychiatric nurses and the range of requirement for registered psychiatric nurses in the future. This information should include the type and level of nurses required to meet employment demands, and changes in employment settings for registered psychiatric nurses.

Alternative Manpower Strategies

Previous manpower strategies for psychiatric nurses have tended to focus on increasing the supply through increased training outputs. A number of significant occupational issues affecting both recruitment and retention of nurses have been identified in this report. There is little validated research to indicate which types of recruitment and retention strategies are likely to be successful, nor which are likely to be the most successful over the short and longer term. There is, however, widespread belief that the development and implementation of effective recruitment and retention strategies could have a significant influence on reducing the projected shortage of psychiatric nurses in western Canada.

RECOMMENDATION #2.

The western region should conduct research to assess which types of short and longer term retention and recruitment strategies would likely be the most successful in increasing the supply of active psychiatric nurses. This research should include the identification of controllable and uncontrolable factors which impact on retention and recruitment.

Education and health manpower planners in all four provinces should be consulted, and input should be sought from the respective registered psychiatric nurses associations and nursing employers.

Research into alternative manpower planning approaches for this occupation should focus on addressing the educational and organizational practice factors affecting recruitment and retention.

Review of the Education of Psychiatric Nurses

The education process clearly has a considerable impact on the supply of psychiatric nurses. There is now, or will likely be in the future, a problem in recruiting qualified applicants into programs for entry-level training as psychiatric nurses. Attrition rates also suggest that these programs or the qualifications of the students accepted into them are not an appropriate match.

Employers have found it difficult to retain graduates in the active workforce. The high rate of occupational shift out of the psychiatric nursing profession suggests that there may be conflicts between the educational experience and expectations of a psychiatric nurse and actual experience in the job setting.

In addition to these entry-level training concerns which will have a serious impact on the future manpower strategies, there is some concern about the availability and accessibility of educational opportunities for active registered psychiatric nurses who are currently employed. This study has focussed on the more general requirement for registered psychiatric nurses. The projected supply and requirement for certain types and levels of

specialist psychiatric nurses requires study. The appropriate type, length, and setting for these education programs should also be studied.

It has been suggested in this report that successful recruitment of inactive nurses back into the active workforce may be somewhat linked to the availability and accessibility of good orientation or refresher training programs. This issue has not been studied sufficiently to determine whether this type of training could significantly increase the supply of psychiatric nurses. There is a need to study the most appropriate means of accomplishing this type of education and assessing its efficiency and effectiveness in increasing the supply of active psychiatric nurses.

RECOMMENDATION #3.

Research should be undertaken to examine the current educational programs for this occupation. This research should include:

- an examination of the entrance requirements to training programs, the accessibility of these programs to all qualified candidates, and the prospective student selection process;
- an examination of the factors affecting the relationship between education and the practice of nursing in both institutional and community settings, and the educational experiences which affect a nurse's job expectations;
- an examination of the support or guidance resources within an educational setting and the extent to which these resources contribute to reducing the attrition out of nursing programs; and
- an examination of how the educational process affects the image of the nursing profession generally.

Co-ordination of Health Manpower Strategies

One of the factors influencing the supply of registered psychiatric nurses in the four western provinces is migration between the provinces, as well as migration in or out to other provinces in Canada. The assessment of future supply in western Canada in this report assumed that historical patterns of

migration would continue over the next twenty years. It would appear that co-ordination of health manpower strategies, including recruitment and retention incentives, in the western region could prove beneficial. It has been suggested in this report that the nursing labour pool is relatively mobile and there are projected shortages of nurses in other parts of North America. It is likely that the western region may, in future, have to compete vigourously to retain its current and future supply of psychiatric nurses.

RECOMMENDATION #4.

The western region should coordinate health manpower planning strategies to recruit and retain psychiatric nurses.

Consideration should be given to coordinating the following:

- compensation and benefit packages for both full-time and part-time psychiatric nurses, as well as any other financial incentives which may be considered to reduce shortages in particular geographic locations.
- sharing information and results of pilot retention and recruitment strategies undertaken in each province and the development of long-term research projects.
- development of specialized training programs to meet the western region's need for management-level psychiatric nurses, as well as psychiatric nursing specialists.

PROVINCIAL RECOMMENDATIONS

On the basis of the current statistical data concerning the supply and requirement for psychiatric nurses in the four western provinces, as well as, consideration of the numerous factors which affect the supply and requirement, it would appear that there is a significant requirement for additional psychiatric nurses both in the short and long term future. Three alternative strategies for addressing these projected shortages were described and discussed in previous sections of this report. On the basis of this assessment, specific recommendations were developed for each province.

In developing these specific recommendations, the following key factors have been considered:

- the data base and key assumptions on which the current and future supply and requirement for psychiatric nurses is projected has many weaknesses, although it is the best information currently available;
- there are many occupational factors which impact on the supply and requirement for psychiatric nurses which cannot be accurately measured or projected in the future;
- historically, there have been periods of acute shortages followed by acute surpluses of nurses in Canada;
- it is doubtful that merely increasing the size or number of training programs will solve all of the problems associated with nursing requirements;
- there is a need to develop a plan which allows for the gradual increase in training programs on a phased basis over several years;
- the plan should permit each province to modify its training program enrollment on an annual basis to reflect updated supply and requirement projections;
- there are other factors such as labour market forces, hospital construction projects, governmental health policies, economic conditions, productivity changes, technological innovations, as well as, geographic distribution problems which impact on the supply and requirement for psychiatric nurses;
- the practicality of a province being able to adjust its training programs in the short term (1-2 years) must be considered.

On the basis of these key factors, as well as extensive discussions with the project Steering Committee, we have developed the following training recommendations for psychiatric nurses for each province.

BRITISH COLUMBIA

British Columbia will experience shortages of registered psychiatric nurses in the range of 17% of total requirements over the period 1981-1985 if the net occupational shift is currently - 10%, or it will have a shortage of 10% if the net occupational shift is - 8%. In view of the limited data base, however, these projections should be viewed with some caution. If a large proportion of psychiatric nurses work on a part-time basis, the projected requirement would significantly increase. A major problem facing British Columbia is the high rate of attrition out of entry-level psychiatric nursing programs. In addition, there has been some concern raised about the future viability of the profession. In light of these concerns, our recommendations focus on reducing attrition as a first step, as well as developing and implementing retention and recruitment strategies. These efforts will assist in reducing the projected shortages identified in this report, but they will not completely meet the projected net requirements. Our recommendations are based on the rationale as contained in Strategy C in this report.

RECOMMENDATION #5.

The Province of British Columbia should improve its collection and analysis of data on both active and inactive registered psychiatric nurses so that informed decisions may be made in future years on both the requirement for and supply of registered psychiatric nurses in the Province.

RECOMMENDATION #6.

The Province of British Columbia should design and pilot test retention and recruitment strategies as a first priority and, based on the results of this research, develop and implement retention and recruitment strategies as soon as possible.

RECOMMENDATION #7.

The Province of British Columbia should make efforts to increase the number of entry-level training outputs through reducing the attrition out of current programs as a first step.

RECOMMENDATION #8.

The Province of British Columbia should carefully monitor the success of retention or recruitment strategies and the supply and requirement for psychiatric nurses in order to be able to make any changes required in training program size in 1985, or sooner.

ALBERTA

Alberta is currently facing a minor shortage of registered psychiatric nurses. Longer-term shortages of between 20% and 35% are projected based on the assumptions used in this report. It should be emphasized, however, that the data base and assumptions are unvalidated and that this range of projected shortage is significantly affected by the net occupational shift assumptions. The opportunity for attracting registered nurses into psychiatric nursing positions does not appear to be good in light of the projected major shortages of registered nurses. The opportunity for securing significant numbers of psychiatric nurses from other parts of Canada or from outside Canada may not be good in light of projected shortages elsewhere. The high attrition rate out of existing basic entry training programs for psychiatric nurses presents a situation that should be of concern. Our recommendations reflect the need to reduce attrition out of these programs, to consider increasing training programs on a phased-in basis over the 1982-1985 timeframe, as well as to develop and implement retention and recruitment strategies. Consequently, our recommendations are based on the rationale as contained in Strategy C in this report.

RECOMMENDATION #9.

The Province of Alberta should improve its collection and analysis of data on both active and inactive registered psychiatric nurses so that informed decisions may be made in future years on both the requirement for and supply of registered psychiatric nurses in the Province.

RECOMMENDATION #10.

The Province of Alberta should design and pilot test retention and recruitment strategies as a first priority and, based on the results of this research, develop and implement retention and recruitment strategies as soon as possible.

RECOMMENDATION #11.

The Province of Alberta should, as a first priority, attempt to reduce the attrition rates out of existing entry-level training programs in order to increase the number of entry level training outputs in the 1982-1985 timeframe.

RECOMMENDATION #12.

The Province of Alberta should carefully monitor the success of retention or recruitment strategies and the supply and requirement for registered psychiatric nurses in order to make any other changes in training program size in 1985 or sooner.

SASKATCHEWAN

The Province of Saskatchewan currently has an almost balanced situation between supply and requirement for psychiatric nurses according to the projections contained in this report. Minor shortages are projected to gradually increase over the next twenty years. A serious concern in Saskatchewan is that the effect of increased training outputs is diminished by migration of registered psychiatric nurses out of the province. It is believed that it would be more effective and efficient to focus on strategies to improve the retention and recruitment of the current supply, rather than increase training outputs at this time beyond that currently planned. Both short and longer term retention and recruitment strategies are required to address the projected shortages indicated in this report. Consequently, our recommendations are based on the rationale as contained in Strategy B in this report.

RECOMMENDATION #13.

The Province of Saskatchewan should improve its collection and analysis of data on both active and inactive registered psychiatric nurses so that informed decisions may be made in future years on both the requirement for and the supply of registered psychiatric nurses in the Province.

RECOMMENDATION #14.

The Province of Saskatchewan should design and pilot test retention and recruitment strategies as a first priority and, based on the results of this research, develop and implement retention and recruitment strategies as soon as possible.

RECOMMENDATION #15.

The Province of Saskatchewan should maintain the same number of entry level training outputs and attempt to reduce the attrition out of the existing programs.

RECOMMENDATION #16.

The Province of Saskatchewan should carefully monitor the success of retention or recruitment strategies and the supply and requirement for registered psychiatric nurses to make any other changes in training program size in 1985 or sooner.

MANITOBA

The Province of Manitoba is currently facing shortages in psychiatric nurses, according to the projections contained in this report, and minor shortages are projected over the next 20 years. Both short and long term strategies addressing retention and recruitment issues could assist in reducing this projected shortage, and an improved data base could assist in more accurately determining the extent of shortage in future. Our recommendations are based on the rationale as contained in Strategy B in this report.

RECOMMENDATION #17.

The Province of Manitoba should improve its collection and analysis of data on both active and inactive registered psychiatric nurses so that informed decisions may be made in future years on both the requirement for the supply of registered psychiatric nurses in the Province.

RECOMMENDATION #18.

The Province of Manitoba should design and pilot test retention and recruitment strategies as a first priority and, based on the results of this research, develop and implement retention and recruitment strategies as soon as possible.

RECOMMENDATION #19.

The Province of Manitoba should maintain the same number of entry level training outputs and closely monitor the attrition out of existing programs.

RECOMMENDATION #20.

The Province of Manitoba should carefully monitor the success of retention or recruitment strategies and the supply and requirement for registered psychiatric nurses in order to be able to effect any other changes in training program size in 1985 or sooner.

APPENDIX A

STUDY APPROACH AND METHODOLOGY

STUDY APPROACH

Introduction

In order to achieve the study objectives, the work program consisted of three key activities. These were:

- the analysis of manpower supply and requirements, and the calculation of net manpower requirements;
- the analysis of existing training programs for Western Canada;
- the development of recommendations for alternative training locations and funding arrangements.

Analysis of Manpower Supply and Requirements

The analysis of manpower supply and requirements was designed to allow for a variety of data inputs, and for different emphasis on the occupation under review. A variety of data sources were used including provincial and national associations, health insurance agencies, and provincial health and education departments. In all instances, data was developed independently of previously published sources.

In addition to the basic projection of net manpower requirements, a number of sensitivity analyses have been completed to assess the impact of changes in the factors affecting supply and requirements, prior to developing recommendations for either additional training programs, or expanding existing training programs.

Approaches to Determining Manpower Requirements

The approach developed to determine manpower requirements used three methods of projection. These are discussed below.

1. Service Utilization Approach

The utilization approach is based on an analysis of the pattern of health service usage. It establishes trends in service utilization and projects these onto future population estimates. There are three steps in the service utilization approach.

Step 1 - Determine Per Capita Utilization Rate

Historical data of the number of services provided, by age and sex of recipient is derived. The number of services per age/sex group is then divided by the population for group in the corresponding year. This results in a per capita utilization rate.

Step 2 - Project Future Service Required

The per capita utilization rate is projected onto the low, medium and high population for each year from 1981 to 2000. This results in an estimate of total future services.

Step 3 - Estimated Number of Practitioners Required

Having determined the total future services, the model projects the number of practitioners required, by assuming a constant level of services per practitioner. The number of services per practitioner is determined by dividing total services by the number of practitioners in the base year. To estimate the number of practitioners, the model divides total future services required by the number of services per practitioner.

2. Service Target Ratio Approach

Service target ratios reflect a theoretical optimal manpower level required to meet health service requirements in the occupation under review. They are expressed as the ratio of practitioner to population. The service target ratios are derived based on discussion with health authorities, review of published reports, articles and summary of defined health care needs.

3. Population Ratio Approach

Population ratios are derived by dividing the total population at a specific point in time by the number of active practitioners. This results in a ratio of practitioners to population.

These ratios are analysed to determine if any trends exists. To project future manpower requirements, the model divides total projected population by the previously determined population ratio.

Summary of Approaches to Projecting Manpower Requirements

The three approaches outlined above have been used for the calculation of manpower requirements for this occupation. The specific application of each approach to this occupation is discussed under General Assumptions, Appendix B, following.

There were four general study reports issued separately to the Steering Committee which provided further information on the overall study methodology and approach. These reports are:

- Report A - Health Manpower Planning Approaches
- Report B - Health Manpower Planning Organization and Activities in Western Canada
- Report C - A Decision Process to Evaluate the Location of, and Funding Arrangements for Health Occupation Training Programs in Western Canada
- Report D - Population

APPENDIX B

PROVINCIAL NET MANPOWER REQUIREMENTS

Peat, Marwick and Partners

EXHIBIT B-1

REGISTERED PSYCHIATRIC NURSES IN WESTERN CANADA

Year	British Columbia[1]	Alberta[2]	Saskatchewan[3]	Manitoba[4]
1975			542	833
1976	1,772		520	846
1977	1,725		491	861
1978	1,761		544	912
1979	1,747	757	545	901
1980	1,786	744	560	912

NOTES:

1. Registered Psychiatric Nursing Association of British Columbia (RPNABC).
2. Psychiatric Nurses Association of Alberta (PNAA).
3. Saskatchwan Psychiatric Nurses Association (SPNA).
4. Registered Psychiatric Nurses Association of Manitoba (RPNAM).

GENERAL ASSUMPTIONS

Exhibit B-1, opposite, shows the recent historical trend of individual psychiatric nurses in western Canada. These figures reflect the number of registered psychiatric nurses who were active in nursing in their respective provinces, as identified by the sources noted at the bottom of the table.

Where possible, the historical data provided by associations was compared with the data provided by provincial government sources. Discrepancies were noted in some provinces and for consistency the respective association data base was used as it provided greater detail on other factors required in the analysis.

The Associations did not provide information on the estimated or actual breakdown between part-time and full-time practitioners for Exhibit 1. Therefore, it was not possible to determine full-time equivalents for psychiatric nurses. In Alberta, there were 670 full time and 74 part time psychiatric nurses in 1980. Similar information could not be obtained for Saskatchewan or Manitoba. A survey of active and inactive psychiatric nurses in British Columbia in 1977 indicated that 9% of the active respondents employed in psychiatric nursing worked on a part-time basis, and 29% of the inactive respondents worked on a casual basis.

The degree of accuracy of the information shown in Exhibit 1 is unknown. In Saskatchewan, there are approximately 800 active registered psychiatric nurses. The number of established positions in 1978 was 555 (of which 42 were vacant). (It should be noted that the term "active" does not necessarily mean employed). British Columbia government statistics indicated 1,765 active registered psychiatric nurses in 1979, while the Association reported 1,747 in that year. The data bases could not be validated and consequently it is difficult to have a high level of confidence in these numbers.

EXHIBIT B-2

FACTORS AFFECTING MANPOWER SUPPLY

PSYCHIATRIC NURSES, WESTERN CANADA

Factor	British Columbia	Alberta	Saskatchewan	Manitoba
Opening Stock	1,786	744	560	912
Net Migration	5 for all years	2.5%	-20 for all years	-10 for all years
Net Immigration	10 for all years	1.0%	0	-1 for all years
Net Occupational Shift	-8.0% & -10.0%	-8.0% & -10.0%	-8.0% & -10.0%	-8.0% & -10.0%
Training Output (Entry level)	125	40	50 in 1981 70 in 1982 75 in 1983-2000	40 in 1981 48 in 1982 57 in 1983 65 in 1984 75 in 1985 86 in 1986 90 in 1987-2000

Supply Assumptions

The general assumptions made with respect to each of the factors which have the potential to affect manpower supply are shown in Exhibit B-2, opposite.

- Opening stock - the number of active registered psychiatric nurses as presented in Exhibit 1.

- Net migration - expressed as a percentage of opening stock or an absolute value. It was assumed that the historical trend would continue at a constant rate. There is inadequate Association data on outflows of psychiatric nurses to other provinces and the percentages values shown may be underestimating outflows.

- Net immigration - expressed as a percentage of opening stock or an absolute value. It was assumed that the historical trend would continue at a constant rate. There is inadequate Association data on outflows and the percentages values shown may be underestimating outflows.

- Net occupational shift - expressed as a percentage of opening stock. This factor includes movements from active to inactive, inactive to active, and attrition due to death or retirement. A range of -8% to -10% was assumed to be the status quo and that this range would be constant over the next twenty year period. There is no valid evidence to support this assumption and this may be understating or overstating supply. It should be emphasized that the use of -8% and and -10% net occupational shift significantly affects the projected net requirements shown in this report, and our confidence in the projected net requirements is limited as we were unable to validate this extremely sensitive assumption.

- Training outputs (entry-level) - the number of planned entry-level outputs as projected by respective educational authorities in each province as indicated in Exhibit 3 (opposite page III-1). It was

assumed that these planned outputs would remain as indicated until the year 2000, which may be overestimating outputs if enrollment figures do not meet quota levels. It was also assumed that attrition from these programs would remain at the same rate, which may be under or overestimating outputs. Training outputs from refresher or bridging programs were not included in this analysis.

SENSITIVITY ANALYSIS

The most significant assumption which could not be validated was the net occupational shift factor for psychiatric nurses. In order to test the sensitivity of this assumption, several analyses were undertaken.

Net Occupational Shift Factor

The nursing professions are predominantly female and there has always been a significant amount of movement in and out of the active workforce, as well as movement from the nursing profession to another profession. The net occupational shift factor was developed to assess the extent of this movement and its impact on the present and future supply of registered psychiatric nurses in western Canada. The net occupational shift factor was defined to include:

- net movement from active to inactive or from inactive to active status,
- net movement into the profession from another profession or movement out of the active nursing profession to another profession, and
- attrition due to death or retirement.

A standard definition of both types of net movement was developed at the outset of the study. In the nursing professions, attrition due to death or retirement was included as part of the net occupational shift factor. This

EXHIBIT B-3

EFFECT OF VARYING NET OCCUPATIONAL SHIFT FACTOR ON NET REQUIREMENT FOR PSYCHIATRIC NURSES IN THE WESTERN CANADA IN 1981

PROVINCES	NET OCCUPATIONAL SHIFT FACTOR				
	-12.5%	-10%	-8%	-6.5%	-5%
British Columbia	109	74	38	11	16
Alberta	49	34	19	-8	3
Saskatchewan	44	33	22	13	-5
Manitoba	87	69	51	37	21
Western Region Total	289	210	130	69	35

Note: A minus sign indicates a surplus. These numbers represent individuals, not full-time equivalents.

was done because accurate information for each province on the age breakdown of active practitioners was not available, and no information was available on the age breakdown of inactive practitioners. Later in this section, exhibits setting out the age and sex breakdown of active practitioners for Manitoba, British Columbia and Alberta are provided. We were unable to obtain similar information for Saskatchewan.

The net occupational shift factor was also used as an approximation of average working life. There are no working life expectancy tables for registered psychiatric nurses in Canada, and no similar tables available elsewhere. The sensitivity of the net occupational shift factor on the present and future supply of psychiatric nurses was tested under the following scenarios:

TABLE 1

Net Occupational Shift Factor and
Average Working Life Approximations

Net Occupational Shift	Average Working Life Approximation
- 5.0%	20 years
- 6.5%	15 years
- 8.0%	12 years
-10.0%	10 years
-12.5%	8 years

There is no validated information with respect specifically to the net occupational shift of psychiatric nurses. It was assumed that this profession is similar to registered nurses with respect to occupational shift. Because of the number of occupational issues presently facing the nursing profession, it was believed that the net occupational shift presently ranges from -8% to -10%. There is no validated evidence to support this assumption. Following discussions with the Steering Committee, nursing associations and nursing employers, these two scenarios were selected for use in this report. Exhibit B-3, opposite, sets out the results of the analyses of the net requirement for psychiatric nurses in western Canada in 1981 varying the net occupational shift factor. These analyses demonstrate the extreme sensitivity of the net

occupational shift factor and the impact this has on the net requirement for psychiatric nurses in western Canada.

Projected Supply Trend

The historical trend in supply differs somewhat from the projected forecast trend shown in this report. Historically the supply trend in British Columbia was flat and under either scenario in this report there would be a slightly decreasing stock over the twenty year timeframe. Only two years of historical information was available for Alberta. In Saskatchewan, a review of historical information indicated that from 1975 to 1978, the supply of psychiatric nurses decreased slightly, then increased slightly from 1978 to 1980. The projections shown in this report shows a continuing increase over the twenty year timeframe. In Manitoba, the supply increased from 1975 to 1978, decreased very slightly in 1979 and then increased in 1980 to the 1978 level. The projected supply trends in this report, indicate an increase under the -8% net occupational shift or a decrease under the -10% net occupational shift. The reasons why the historical trends in supply may differ from the projected forecast trend may be attributable to a variety of complex factors which could not be measured in the past, nor accurately projected into the future. The model developed for this study used a number of critical factors known to effect the supply of psychiatric nurses (migration, immigration, training, and net occupational shift). The historical trend in the migration and immigration factors may have been misleading if the historical records, as recorded by associations, were not accurate. Training assumptions used in this report were based on the information provided, however several key assumptions were made about the participation of entry level graduates in the workforce which could not be compared with historical information. As indicated earlier, the net occupational shift assumption is undoubtedly the most critical assumption for future supply projections and thus selection of two values (-8% and -10%) held constant over the entire projection period could have exaggerated the trend in supply. In addition to the factors used to develop the supply projections contained in this report, there are other factors which impact on the supply which could not be incorporated as part of the forecasting model as there is no information available to measure either

the historical impact of these factors or their likely future impact. Some of these factors could include:

- availability of employment opportunities outside of the nursing profession;
- general economic conditions;
- social changes encouraging/discouraging movement into/out of nursing professions;
- availability/shortage of day care facilities for working mothers;
- divorce rates influencing a decision to return to the workforce or to increase labour participation rate;
- image of the profession influencing prospective students choosing a career path;
- salary and benefits for nursing positions relative to length of training required, working conditions, career mobility in comparison to other industry sectors.

According to Association spokesmen, nursing employers and research undertaken by others, the nursing professions are currently facing many major occupational issues. These issues have been commented on in this report and this may in part explain why the historical trend in supply may differ from the projected supply.

Requirement Assumptions

The population ratio approach was used to project the number of psychiatric nurses required in each province from 1981-2000. The population in each province in 1980 and the projected medium population from 1981-2000 was obtained from government sources. The ratio of psychiatric nurses required to

meet the projected population was held constant at the 1980 rates. The following ratios were used:

TABLE B-2

Ratio of Psychiatric Nurses to Medium Population in Each Province

Province	Number of Psychiatric Nurse Per Population
British Columbia	1:1,447
Alberta	1:1,880
Saskatchewan	1:1,720
Manitoba	1:1,160

Two analyses were undertaken using this approach. The most recent ratio, as shown above, was computed and an average ratio for the last five years. The difference in net requirement was marginal and the most recent ratio was selected as the most likely range of future requirement.

The general assumptions implicit in this approach have been set out in the text of this report. Unfortunately, there is no information available to accurately assess whether this approach is reliable. Because of the serious concerns regarding the occupational issues facing this profession, attention should be focussed on the 1981-1985 timeframe and research should be undertaken to develop a more accurate means of developing requirement projections.

PROVINCIAL ASSUMPTIONS

Assumptions were made with respect to the key supply factors used to develop supply projections. In this section, each of the numerical or percentage values used and the sources of this information for each province are set out.

Exhibits B-4 to B-7, following, summarize the historical number of practitioners, the assumptions made for each of the supply factors and sources of this information for each province.

SUMMARY OF NET REQUIREMENTS

Exhibits B-8 to B-15, following, set out the projected supply scenarios, the projected requirement and the net requirement for registered psychiatric nurses in each Province and in the western region.

- Exhibits B-8 and B-9 show the projected supply, requirement and net requirement based on a net occupational shift of -8% (Scenario I) and -10% (Scenario II). All other supply assumptions were held constant from 1981-2000.

- Exhibits B-10 and B-11 show the effect of implementing Strategy A - increasing entry-level training outputs by approximately one-third over planned levels.

- Exhibits B-12 and B-13 show the effect of implementing Strategy B - reducing the net occupational shift factor. Exhibit B-12 shows the effect of gradually reducing the net occupational shift from -8% to -5% from 1981-2000. Exhibit B-13 shows the effect of gradually reducing the net occupational shift from -10% to -6% from 1981-2000.

- Exhibits B-14 and B-15 show the effect of implementing Strategy C - increasing training outputs by approximately one-third over planned levels and reducing the net occupational shift factor. Exhibit B-14 shows the combined effect of this strategy assuming a -8% net occupational shift in 1981. Exhibit B-15 shows the combined effect of this strategy assuming a -10% net occupational shift in 1981.

This information is the output from the computer planning model developed for this study and was used for the analysis of the various alternative strategies discussed in this report. The graphic interpretation of this information has been set out in the text of this report. As indicated earlier, caution should be exercised in interpreting these figures in light of the serious concerns expressed about the limited data base and the assumptions made with respect to the critical net occupational shift factor.

AGE BREAKDOWN

The age breakdown of active practitioners registered with the respective psychiatric nurses associations in Manitoba, British Columbia and Alberta is set out in Exhibits B-16, B-17 and B-18. No similar information was available for Saskatchewan. The data in the age breakdown exhibits may not concur with that presented in Exhibits B-4 to B-7 as they may represent different points in time or different interpretations of the term "active" psychiatric nurses.

EXHIBIT B-4

REGISTERED PSYCHIATRIC NURSES
BRITISH COLUMBIA

YEAR	TOTAL ACTIVE
1976	1,772
1977	1,725
1978	1,761
1979	1,747
1980	1,786

SOURCE: Registered Psychiatric Nursing Association of British Columbia (R.P.N.A.B.C.)

SUPPLY FACTORS	NUMERICAL OR PERCENTAGE VALUE	SOURCE
Opening Stock	1,786	As presented above
Net Migration	5 for all years	R.P.N.A.B.C.
Net Immigration	10 for all years	R.P.N.A.B.C.
Net Occupational Shift	-8% and -10%	PMP Assumption
Training Output (Entry Level)	125	B.C. Department of Education

EXHIBIT B-5

REGISTERED PSYCHIATRIC NURSES

ALBERTA

YEAR	TOTAL ACTIVE
1975	
1976	
1977	
1978	
1979	757
1980	744

SOURCE: Psychiatric Nurses Association of Alberta (P.N.A.A.)

Statistics for 1975 - 1978 inclusive were not available.

SUPPLY FACTOR	NUMERICAL OR PERCENTAGE VALUE	SOURCE
Opening Stock	744	As presented
Net Migration	2.5% of opening stock	P.N.A.A.
Net Immigration	1.0% of opening stock	P.N.A.A.
Net Occupational Shift	-8% and -10%	PMP Assumption
Training Output (Entry Level)	40	Alberta Department of Advanced Education

EXHIBIT B-6

REGISTERED PSYCHIATRIC NURSES

SASKATCHEWAN

YEAR	TOTAL ACTIVE
1975	542
1976	520
1977	491
1978	544
1979	545
1980	560

SOURCE: Saskatchewan Psychiatric Nurses Association (S.P.N.A.)

SUPPLY	NUMERICAL OR PERCENTAGE VALUE	SOURCE
Opening Stock	560	As presented above
Net Migration	-20 for all years	S.P.N.A.
Net Immigration	0	S.P.N.A.
Net Occupational Shift	-8% and -10%	PMP Assumption
Training Output (Entry Level)	50 in 1981 70 in 1982 75 in 1983-2000	Saskatchewan Department of Continuing Education

EXHIBIT B-7

REGISTERED PSYCHIATRIC NURSES

MANITOBA

YEAR	TOTAL ACTIVE
1975	833
1976	846
1977	861
1978	912
1979	901
1980	912

SOURCE: Registered Psychiatric Nurses Association of Manitoba (R.P.N.A.M.)

SUPPLY FACTORS	NUMERICAL OR PERCENTAGE VALUE	SOURCE
Opening Stock	912	As presented above
Net Migration	-10 for all years	R.P.N.A.M.
Net Immigration	-1 for all years	R.P.N.A.M.
Net Occupational Shift	-8% and -10%	PMP Assumption
Training Output (Entry Level)	40 in 1981 48 in 1982 57 in 1983 65 in 1984 75 in 1985 86 in 1986 90 in 1987-2000	Manitoba Department of Education

EXHIBIT B-8

NET REQUIREMENT FOR PSYCHIATRIC NURSES
SCENARIO I - STATUS QUO

	British Columbia		Alberta		Saskatchewan		Manitoba		Region	
	Stock	Req.	Stock	Req.	Stock	Req.	Stock	Req.	Stock	Req.
1981	1,783	1,821	751	770	545	567	868	919	3,947	4,077
Net		38		19		22		51		130
1982	1,780	1,858	757	800	552	575	836	924	3,925	4,157
Net		78		43		23		88		232
1983	1,778	1,896	763	831	562	584	815	929	3,918	4,240
Net		118		68		22		114		208
1984	1,776	1,934	768	861	572	592	804	935	3,920	4,322
Net		158		93		20		131		402
1985	1,774	1,972	774	887	582	601	803	942	3,933	4,402
Net		198		113		19		139		469
1990	1,766	2,157	797	1,010	618	642	863	973	4,044	4,782
Net		391		213		24		110		738
1995	1,760	2,325	816	1,129	642	679	906	999	4,124	5,132
Net		565		313		37		93		1,008
2000	1,757	2,472	831	1,245	657	713	934	1,021	4,179	5,451
Net		715		414		56		87		1,272

EXHIBIT B-9

NET REQUIREMENT FOR PSYCHIATRIC NURSES
SCENARIO II - STATUS QUO

	British Columbia		Alberta		Saskatchewan		Manitoba		Region	
	Stock	Req.	Stock	Req.	Stock	Req.	Stock	Req.	Stock	Req.
1981	1,747	1,821	736	770	534	567	850	919	3,867	4,077
Net		74		34		33		69		210
1982	1,713	1,858	728	800	531	575	889	924	3,861	4,157
Net		145		72		44		122		383
1983	1,681	1,896	721	831	533	584	768	929	3,703	4,240
Net		215		110		51		161		537
1984	1,653	1,934	714	861	534	592	745	935	3,646	4,322
Net		281		147		58		190		676
1985	1,628	1,972	707	887	536	601	734	942	3,605	4,402
Net		344		180		65		208		797
1990	1,535	2,157	681	1,010	542	642	755	973	3,513	4,782
Net		622		329		100		218		1,269
1995	1,479	2,325	662	1,129	545	679	769	999	3,455	5,132
Net		846		467		134		230		1,677
2000	1,447	2,472	649	1,245	547	713	778	1,021	3,421	5,451
Net		1,025		596		166		243		2,030

EXHIBIT B-10

NET REQUIREMENT FOR PSYCHIATRIC NURSES
SCENARIO I - STRATEGY A

	British Columbia		Alberta		Saskatchewan		Manitoba		Region	
	Stock	Req.	Stock	Req.	Stock	Req.	Stock	Req.	Stock	Req.
1981	1,783	1,821	751	770	545	567	868	919	3,947	4,077
Net		38		19		22		51		130
1982	1,780	1,858	757	800	552	575	836	924	3.925	4,157
Net		78		43		23		88		232
1983	1,818	1,896	778	831	587	584	815	929	3,998	4,240
Net		78		53		-3		114		242
1984	1,853	1,934	798	861	620	592	823	935	4,094	4,322
Net		81		63		-28		112		228
1985	1,884	1,972	817	887	651	601	843	942	4.195	4,402
Net		88		70		-50		99		207
1990	2,009	2,157	900	1,010	770	642	1,004	973	4,683	4,782
Net		148		110		-128		- 31		-99
1995	2,091	2,325	966	1,129	848	679	1,113	999	5,008	5,132
Net		234		163		-169		-114		114
2000	2,145	2,472	1,019	1,245	900	713	1,185	1,021	5,249	5,451
Net		327		226		-187		-164		202

EXHIBIT B-11

NET REQUIREMENT FOR PSYCHIATRIC NURSES
SCENARIO II - STRATEGY A

	British Columbia		Alberta		Saskatchewan		Manitoba		Region	
	Stock	Req.	Stock	Req.	Stock	Req.	Stock	Req.	Stock	Req.
1981	1,747	1,821	736	770	534	567	850	919	3,867	4,077
Net		74		34		33		69		210
1982	1,713	1,858	728	800	531	575	802	924	3,774	4,157
Net		145		72		44		122		383
1983	1,721	1,896	736	831	558	584	768	929	3,783	4,240
Net		175		95		26		161		457
1984	1,729	1,934	743	861	582	592	764	935	3,818	4,322
Net		205		118		10		171		504
1985	1,736	1,972	749	887	604	601	773	942	2,862	4,402
Net		236		138		-3		169		540
1990	1,762	2,157	777	1,010	684	642	888	973	4,111	4,782
Net		395		233		-42		85		671
1995	1,778	2,325	797	1,129	732	679	958	999	4,265	5,132
Net		547		332		-53		41		867
2000	1,787	2,472	811	1,245	760	713	1,000	1,021	4,358	5,451
Net		685		434		-47		21		1,093

EXHIBIT B-12

NET REQUIREMENT FOR PSYCHIATRIC NURSES
SCENARIO I - STRATEGY B

	British Columbia		Alberta		Saskatchewan		Manitoba		Region	
	Stock	Req.	Stock	Req.	Stock	Req.	Stock	Req.	Stock	Req.
1981	1,777	1,821	748	770	543	567	865	919	3,933	4,077
Net		44		22		24		54		144
1982	1,769	1,858	752	800	548	575	830	924	3,899	4,157
Net		89		48		27		94		258
1983	1,762	1,896	756	831	557	584	807	929	3,882	4,240
Net		134		75		27		122		358
1984	1,766	1,934	764	861	570	592	799	935	3,899	4,322
Net		168		97		22		136		423
1985	1,770	1,972	772	887	581	601	801	942	3,924	4,402
Net		202		115		20		141		478
1990	1,838	2,157	831	1,010	643	642	897	973	4,209	4,782
Net		319		179		-1		76		573
1995	1,975	2,325	925	1,129	718	679	1,012	999	4,630	5,132
Net		350		204		-39		-13		502
2000	2,108	2,472	1,025	1,245	784	713	1,131	1,021	5,048	5,451
Net		364		220		-71		-110		403

EXHIBIT B-13

NET REQUIREMENT FOR PSYCHIATRIC NURSES
SCENARIO II - STRATEGY B

	British Columbia		Alberta		Saskatchewan		Manitoba		Region	
	Stock	Req.	Stock	Req.	Stock	Req.	Stock	Req.	Stock	Req.
1981	1,747	1,821	736	770	534	567	850	919	3,867	4,077
Net		74		34		33		69		210
1982	1,713	1,858	728	800	531	575	802	924	3,774	4,157
Net		145		72		44		122		383
1983	1,681	1,896	721	831	533	584	768	929	3,703	4,240
Net		215		110		51		161		537
1984	1,669	1,934	720	861	539	592	752	935	3,680	4,322
Net		265		141		53		183		642
1985	1,657	1,972	720	887	545	601	748	942	3,670	4,402
Net		315		167		56		193		732
1990	1,636	2,157	729	1,010	576	642	802	973	3,743	4,782
Net		521		281		66		171		1,039
1995	1,681	2,325	765	1,129	616	679	868	999	3,930	5,132
Net		644		364		63		131		1,202
2000	1,783	2,472	829	1,245	670	713	951	1,021	4,233	5,451
Net		689		416		43		70		1,218

EXHIBIT B-14

NET REQUIREMENT FOR PSYCHIATRIC NURSES
SCENARIO I - STRATEGY C

	British Columbia		Alberta		Saskatchewan		Manitoba		Region	
	Stock	Req.	Stock	Req.	Stock	Req.	Stock	Req.	Stock	Req.
1981	1,777	1,821	748	770	534	567	865	919	3,933	4,077
Net		44		22		33		54		144
1982	1,769	1,858	752	800	548	575	830	924	3,899	4,157
Net		89		48		27		94		258
1983	1,802	1,896	771	831	582	584	807	929	3,962	4,240
Net		94		60		2		122		278
1984	1,843	1,934	793	861	618	592	818	935	4,072	4,322
Net		91		68		-26		117		250
1985	1,881	1,972	815	887	650	601	841	942	4,187	4,402
Net		91		72		-49		101		215
1990	2,090	2,157	937	1,010	800	642	1,042	973	4,869	4,782
Net		67		73		-158		- 69		- 87
1995	2,338	2,325	1,090	1,129	944	679	1,238	999	5,610	5,132
Net		-13		39		-265		-239		-478
2000	2,560	2,472	1,266	1,245	1,084	713	1,426	1,021	6,336	5,451
Net		-88		-21		-371		-405		-885

EXHIBIT B-15

NET REQUIREMENT FOR PSYCHIATRIC NURSES
SCENARIO II - STRATEGY C

	British Columbia		Alberta		Saskatchewan		Manitoba		Region	
	Stock	Req.	Stock	Req.	Stock	Req.	Stock	Req.	Stock	Req.
1981	1,747	1,821	736	770	534	567	850	919	3,867	4,077
Net		74		34		33		69		210
1982	1,713	1,858	728	800	531	575	802	924	3,774	4,157
Net		145		72		44		122		383
1983	1,721	1,896	736	831	558	584	768	929	3,783	4,240
Net		175		95		26		161		457
1984	1,745	1,934	749	861	587	592	771	935	3,852	4,322
Net		189		112		5		164		470
1985	1,766	1,972	762	887	614	601	787	942	3,929	4,402
Net		206		125		-13		155		473
1990	1,874	2,157	830	1,010	725	642	940	973	4,369	4,782
Net		283		180		-83		33		413
1995	2,009	2,325	913	1,129	821	679	1,075	999	4,818	5,132
Net		316		216		-142		- 76		314
2000	2,187	2,472	1,024	1,245	922	713	1,213	1,021	5,346	5,451
Net		285		221		-209		-192		105

EXHIBIT B-16

TOTAL NUMBER OF ACTIVE
PSYCHIATRIC NURSES IN BRITISH COLUMBIA BY AGE

Age Group	Male	Female	Total
Less than 24	2	81	83
25 - 34	195	540	735
35 - 44	212	320	532
45 - 54	114	173	287
55 - 64	79	70	149
65 and over	-	-	-
Unknown	9[1]	28[1]	37[1]
TOTAL	611	1,212	1,823[2]

Source: 1. Unknowns distributed to age categories on basis of known age distribution.

2. Stock based on figures provided by President, R.D.N.A.B.C. and age distribution showed from Report R:13, H.M.R.U.

EXHIBIT B-17

TOTAL NUMBER OF ACTIVE
PSYCHIATRIC NURSES IN ALBERTA BY AGE,

AGE GROUP	MALE	FEMALE	TOTAL
16 - 21	5	15	20
22 - 25	18	85	103
26 - 30	19	78	97
31 - 35	40	67	107
35 - 39	41	59	100
40 - 44	34	40	74
45 - 49	29	31	60
50 - 54	3	16	19
55 - 59	1	5	6
60 - 64	-	4	4
65 and over	-	-	-
Unknown	190	400	590

Source: The Psychiatric Nurses Association of Alberta.

EXHIBIT B-18

TOTAL NUMBER OF ACTIVE

PSYCHIATRIC NURSES IN MANITOBA BY AGE,

AGE GROUP	MALE	FEMALE	TOTAL
20 - 24	11	71	82
25 - 29	52	176	228
30 - 34	67	103	170
35 - 39	45	81	126
40 - 44	44	56	100
45 - 49	73	47	70
50 - 54	82	37	119
55 - 59	27	18	45
60 - 64	13	6	19
65 and over	4	3	7
Unknown	-	-	-
Total	368	598	966

Source: The Registered Psychiatric Nurses Association of Manitoba.

APPENDIX C

BIBLIOGRAPHY

REPORTS

Alberta Hospital Association, Nursing Manpower - A Study of Nursing Supply and Demand in Alberta Hospitals and Nursing Homes, 1980.

Alberta Association of Registered Nurses, Nursing Manpower Needs in Alberta - Current and Future, 1980.

Canadian Association of Practical and Nursing Assistants, Presentation to the Minister, Department of National Health and Welfare, July 1979.

Canadian Nurses Association, Putting "Health" into Health Care, 1980.

Filoromo, T. and Ziff, D., Nurse Recruitment: Strategies for Success, Rockville: Aspen Systems Corporation, 1980, p. 137 - 149.

Foothills Hospital School of Nursing, Survey '79 - A Follow-up of Foothills Hospital School of Nursing Graduates and their Career Patterns 1968 through 1978, 1980.

Government of Saskatchewan, Analysis of Psychiatric Nurses' Staffing Patterns, September 1980.

Manitoba Association of Registered Nurses, Nursing Education: Challenge and Change, 1975.

Psychiatric Nurses' Association of Alberta, A Position Paper Regarding Psychiatric Nursing in the Mental Health Care Delivery System in Alberta, August 1978.

Province of Alberta, Report of the Joint Ministerial Task Force on Nursing Education in Manitoba, 1977.

Registered Nurses Association of Ontario, Report of Task Force on Nursing Shortage, 1981.

Saskatchewan Psychiatric Nurses' Association, Executive Director's Report - Annual Meeting 1980-81.

Saskatchewan Psychiatric Nurses' Association, Degree Program Interest Survey, 1980, (draft report).

Saskatchewan Registered Nurses' Association, Survey of Inactive Nurses, 1980.

St. Boniface General Hospital, Report of the Task Force on Nursing Manpower in the 1980's, October 1981.

University of British Columbia, Health Services Research and Development, Registered Psychiatric Nurses in British Columbia, 1977 - A Descriptive Report, 1980.

University of British Colmbia, Health Services Research and Development, A Survey of Difficult-to-Fill Positions for Registered Nurses and Other Health Care Disciplines in British Columbia, 1980 - First Year-end Report.

University of British Columbia, Health Services Research and Development, ROLLCALL 79, A Status Report of Health Personnel in the Province of British Columbia, March 1980.

University of British Columbia, Health Services Research and Development, ROLLCALL UPDATE 80, A Status Report of Selected Health Personnel in the Province of British Columbia, December 1980.

University of Texas (Austin), Centre for Research, School of Nursing, Conditions Associated with Registered Nurses Employment in Texas, 1980.

U.S. Department of Commerce, Public Health Centre Service, Bethesda, Md. Division of Nursing, Review and Evaluation of Nursing Productivity, Volume III, Literature and Research Review, 1975.

U.S. Department of Health, Education and Welfare, Public Health Service, Health Resources Administration, Nursing Staffing Requirements and Related Topic: A Selected Bibliography, 1979.

National Commission on Nursing (U.S.), Abstracts of State Study and Policy Documents, 1981.

Flaherty, Dr. M. Josephine, Health and Welfare Canada, Employment for Registered Nurses in Canada, 1980.

JOURNAL ARTICLES

Alberta Association of Registered Nurses, "Drastic Nursing Shortage Predicted Unless....", AARN Newsletter, April 1980.

Alberta Association of Registered Nurses, "Supply of Nurses - Can we meet the demand?", AARN Newsletter, November 1980.

Alberta Association of Registered Nurses, "AHA Nursing Manpower Study of Factors in Nursing Supply and Demand", November 1980", AARN Newsletter, March 1981.

Alberta Hospital Association, Management Analysis and Planning Services, "A Proposal for an Analysis of Nursing Manpower Resources and Requirements in Alberta, unpublished, March 1980.

American Nurses Association, "Survey Shows a Million RNs Employed", The American Nurse, October 1980.

Araiyo, M., "Creative Nursing Administration Sets the Climate for Retention", Hospitals, May 1, 1980.

Arnold, Nancy, "Where have all the nurses gone?", British Medical Journal, January 1980.

Association of Operating Room Nurses, "RN Supply Predicted to be Adequate by 1985", AORN Journal, August 1979.

Association of Western Hospitals, "The Nursing Shortage: Current Trends in Recruitment and Retention", AWA Convention Report, September 1980.

Aycock, Edward J. "Nursing - Productivity Gains Under your Control", Hospital Topics, May/June 1978.

Bergman, Rebecca, "Nursing Manpower: Issues and Trends", Journal of Nursing Administration, May 1975.

Brief, Arthur, "Turnover Among Hospital Nurses: A Suggested Model", Journal of Nursing Administration, October, 1979.

Brown, Beverley I. "Realistic Workloads for Community Health Nurses", Nursing Outlook, April 1980.

Del Bueno, D. et al., "Two Ways to Retain Staff", American Journal of Nursing, April 1, 1978.

Driscoll, Veronica M. "Remedies for a Troubled Health Care System", N.Y. State News Association Journal, December 1980.

Fralic, Maryann F., "Nursing Shortage: Coping Today and Tomorrow", Hospitals, May 1980.

Hospitals, "Nursing Shortage Linked to Hospital Environment", January 1980.

Howie, Heather, "What do they have that we don't"?, Health Care, April 1981.

Johnson, Walter L., "Supply and Demand for Registered Nurses - Some observations on the current picture and prospects to 1985" (Part 1 and 2), "Nursing Health Care", August 1980.

Kaiser, P., "Ten Steps to Interviewing Job Applicants", American Journal of Nursing, April, 1978.

International Nursing Review, "Nursing Shortage is Acute in U.S.", March-April 1980.

Journal of Advanced Nursing, "Male/Female Dichotomy in the Nursing Profession in a Time of Social Change", January 1978.

Journal of Gerontological Nursing, Editorial, October 1980.

Kallisch, Phillip A., "The Nursing Shortage, the President and the Congress", Nursing Forum, 1980.

Kuhn, Barbara G., "Prediction of Nursing Requirements from Patient Characteristics - II", International Journal of Nursing Studies, 1980.

Link, Charles R. and Settle, Russell F., "Financial Incentive and Labour Supply of Married Professional Nurses: An Economic Analysis", Nursing Research, July/August 1980.

Link, Charles R. and Settle, Russel F., "Wage Incentive and Married Professional Nurses: A Case of Backward - bending Supply?", Economic Inquiry, February 1969.

Levine, Eugene, "Nursing Manpower - Yesterday, Today, and Tomorrow", American Journal of Nursing, February 1969.

New Zealand Nursing Journal, Editorial "Nursing Manpower Planning - A Matter of Urgency", July 1980.

Allen, Michael, "Finding Nurses for the Future - The Recruitment and Selection of Nurse Learners", Nursing Times, January 1981.

Windsor, Ralph and Collinson, Patricia, "Looking for Tomorrow's Nurses", Nursing Times, October 1980.

Royal, G.C. "Filling the Nursing Schools - A Question of Cost and Calibre", Nursing Times, November 1980.

Seybolt, J.W., and Walker, D.D., "Attitude Survey Proves to be a Powerful Tool for Reversing Turnover", Hospitals, May 1, 1980.

Sheridan, J.E. et al., "Predicting Leadership Behavior in a Hospital Organization", Academy of Management Journal, December, 1978.

Mercer, Geoffrey, "Nurse Employment and Mobility of Trained Staff", Nursing Times, November 1980.

Logan, Winifred, "The migration of nursing personnel", International Nursing Review, July/August 1980.

Marron-Cost, Joan, "Productivity: Key to Cost Containment", Hospitals, September 1980.

McCullough, D.M., "Nursing Manpower Planning", World of Irish Nursing, January 1977.

Quinn, Sheila, "Zero Growth", Nursing Mirror, October 1980.

Watson, L.A., "Keeping Qualified Nurses", Supervisor Nurse, October, 1979.

White, Charles, "Nursing Shortage, Turnover and Some Proposed Solutions", Hospital Forum, June 1977.

White, Charles, "Where Have All the Nurses Gone - and Why?", Hospitals, May, 1980.

White, Charles, "Redefining Professional Nursing: Solution to the Chronic Shortage", Hospital Progress, October 1981.

Province of British Columbia

Province of Alberta

Province of Saskatchewan

Province of Manitoba

WESTERN CANADA
HEALTH MANPOWER TRAINING STUDY

Category #4 - Report XXII

NURSING ASSISTANTS

REPORT XXII

NURSING ASSISTANTS

THE REQUIREMENT FOR ALTERNATIVE TRAINING AND FUNDING ARRANGEMENTS IN WESTERN CANADA

WESTERN CANADA HEALTH MANPOWER TRAINING STUDY
CATEGORY #4 - REPORT XXII
NURSING ASSISTANTS

TABLE OF CONTENTS

		Page
I -	INTRODUCTION	I-1
	Study Background	I-1
	Study Objectives	I-2
	Study Approach	I-2
	Scope of this Report	I-4
	Report Format	I-7
II -	PROJECTED SUPPLY AND REQUIREMENT FOR NURSING ASSISTANTS IN THE WESTERN REGION	II-1
	Western Canada Overview	II-1
	Timing and Location of Manpower Requirements	II-7
	Summary	II-10
III -	PRESENT AND FUTURE MANPOWER STRATEGIES	III-1
	Existing Training Programs	III-1
	Occupational Issues	III-2
	Alternative Manpower Strategies	III-9
IV -	RECOMMENDATIONS	IV-1
	Western Region Recommendations	IV-1
	Provincial Recommendations	IV-6
	British Columbia	IV-8
	Alberta	IV-9
	Saskatchwan	IV-11
	Manitoba	IV-13

EXHIBITS

		Opposite Page
1.	Projected Supply and Requirement for F.T.E. Nursing Assistants in the Western Region	II-1
2.	Projected Supply and Requirement for F.T.E. Nursing Assistants (By Province)	II-7
3.	Training Program Outputs of Nursing Assistants in the Western Region in 1981	III-1
4.	Effect of Implementing Strategy A on the Projected Supply and Requirement for F.T.E. Nursing Assistants	III-11

TABLE OF CONTENTS - CONT'D

EXHIBITS — **Opposite Page**

5. Effect of Implementing Strategy B on the Projected Supply and Requirement for F.T.E. Nursing Assistants III-14

6. Effect of Implementing Strategy C on the Projected Supply and Requirement for F.T.E. Nursing Assistants III-15

7. Effect of Various Alternative Strategies on the Projected Supply and Requirement for F.T.E. Nursing Assistants in the Western Region III-16

TABLES — **Page**

1. Projected Net Requirement for F.T.E. Nursing Assistants in Western Canada 1981 - 2000 ..... II-6

2. Projected Net Requirement for F.T.E. Nursing Assistants (By Province) II-10

3. Present and Future Entry-Level Training Outputs in the Western Region III-11

4. Net Requirement for F.T.E. Nursing Assistants in Western Canada III-16

APPENDICES — **Page**

A - Study Approach and Methodology A-1

B - Provincial Net Manpower Requirements B-1

C - Bibliography C-1

I - INTRODUCTION

This section sets out the overall study objectives and approach to the Western Canada Health Manpower Training Study. This section also outlines the scope and format of this report on nursing assistants in the western region.

The relationship between nursing assistants and other nursing professions is very important. This report on the future supply and requirement for nursing assistants should be read in conjunction with the report on registered nurses which has been issued separately.

STUDY BACKGROUND

The provision of effective health services to the community is, to a considerable degree, dependent on three essential resources:

- an adequate supply of well trained staff in each health occupation group;
- the development of adequate facilities to service the community;
- the availability of adequate funds to ensure cost effective and efficient health services.

The range and complexity of health treatment programs has expanded greatly in Canada during the last twenty-five years. In addition, changing technology and the development of new treatment programs have resulted in an increased requirement for skilled, adequately trained health manpower. These factors have resulted in an increased emphasis on manpower planning and skill training for health occupations to ensure an adequate supply of trained practitioners to meet defined manpower requirements.

The nursing professions represent nearly two-thirds of all trained health occupational groups in western Canada and are an integral component of the

health care system. The provision of high quality nursing services is dependent not only on an adequate supply of well trained specialist staff, but also on the participation of these trained individuals in the active work force.

STUDY OBJECTIVES

The Western Canada Health Manpower Training Study was initiated by the western Premiers at their annual conference in 1980.

The objectives of the study were to:

- assess the existing and future need for health manpower training programs and facilities in western Canada;

- make recommendations for the rationalization of the location and funding of health manpower training programs and facilities in western Canada.

STUDY APPROACH

The study was under the direction of a Steering Committee consisting of health and education government representatives from the provinces of British Columbia, Alberta, Saskatchewan and Manitoba. The study took place over two years and consisted of a review of 26 health occupations grouped into five categories.

Each occupation was studied separately and a report has been produced for each. In addition, a report examining the inter-relations of the occupations within each category has been submitted to the Steering Committee. Category 4 comprised the following occupations:

- Registered Nurses;
- Nursing Assistants;
- Psychiatric Nurses.

Data was collected from provincial associations and from government agencies for each of the occupations. For the nursing occupations, data was collected on the numbers of individuals registered with the association over the last five years and the current status of these individuals as active or inactive practitioners. An attempt was also made to gather data on historical trends, the number of graduates from training, trends in movement of active practitioners to inactive status and occupational shifts out of the profession, trends in migration to or from other provinces, and immigration and emigration.

In the cases where validated and reliable information was not available, association spokesmen, nursing employers and individuals in each of the nursing occupations were interviewed to provide qualitative opinions regarding present and future trends affecting the supply of and requirement for these professionals. Because of the relatively mobile nature of individuals working in the nursing profession, interviews were also held with nursing associations and health manpower planners in other provinces in Canada and in the United States.

An extensive literature review was conducted to examine the problems facing the nursing occupations, relevant research which has been undertaken with regard to these problems, and the solutions proposed by others. Earlier studies conducted by nursing associations, hospital associations and manpower planning commissions, as well as recent journal articles were reviewed. A bibliography of the literature reviewed is contained in Appendix C to this report.

A computerized forecasting model was used to assist in the preparation of projections on the future supply and requirement for each occupation. A critical analysis of these twenty-year projections was then undertaken to develop the supply and requirement scenarios presented in this report.

The lack of a consistent historical data base made it difficult to develop accurate or reliable long-range projections of supply or requirement for the

nursing occupations. The supply and requirement projections contained in this report are as accurate as can be achieved in light of the limited data base now available.

A decision-making process with respect to the future funding and location of training programs was developed for this study. In the nursing occupations, each province presently has its own entry-level and refresher training programs offered at various settings. This study focused on the general requirement for training programs rather than on the specific level or length of training to be provided. The funding of these programs was not examined, as each province is responsible for its own training programs for the nursing occupations.

The scope of the study of the nursing occupations was expanded to examine manpower planning strategies other than training. This approach was adopted to address the particular problems facing the nursing occupations which significantly impact on the projected supply in both the short and longer term.

Separate documents describing the manpower planning methodology and the training decision-making process were issued. A brief summary of the overall study approach and methodology is set out in Appendix A, and details of the provincial net requirements are set out in Appendix B.

SCOPE OF THIS REPORT

In Category 4, three nursing professions were studied: registered nurses, nursing assistants and psychiatric nurses. This report summarizes the findings and recommendations for the nursing assistant occupation. A separate report has been prepared for each of the other two occupations.

Terminology

In British Columbia and Manitoba, individuals in this profession are licensed as Practical Nurses. In Alberta, they are Registered Nursing Assistants and

in Saskatchewan they are Certified Nursing Assistants. In this report, the term nursing assistant is used to describe all individuals practising this occupation in western Canada. For the purposes of this study, a nursing assistant is defined as an individual who:

> "Provides nursing care for patients in hospitals and similar establishments. Takes and records blood pressure, temperature, pulse and respiration rates. Applies dressings and administers injections, medications and treatments under supervision. Reports and records observations and symptoms indicative of change in condition of patients. Assists with administration and discharge of patients. Bathes patients, makes beds, and assists with rehabilitation procedures. Feeds and assists patients in feeding themselves. Answers call bells and patients' services. Performs duties in operating room, outpatients, and other specialized areas, if required."[1]

Calculation of Full-time Equivalents (F.T.E.)

Over the last five years, there has been a significant change in the proportion of nursing assistants working on a full-time as compared to a part-time basis. It is estimated that in 1980, approximately 60% of the active nursing assistants in western Canada worked on a full-time basis (ranging from 37.5 hours to 40 hours per week depending upon agreements in each province), and approximately 40% worked on a part-time basis. There is no validated information on the number of hours worked by each part-time nursing assistant, and no consistent definition of the term "part-time". All requirements for nursing assistants in this report have been expressed in terms of full-time equivalents. A full-time equivalent is defined as the number of nursing assistants required to make up one full-time position. For example, a nursing assistant working full-time represents 1.0 full-time equivalent. A nursing assistant working part-time represents a fraction (such as 0.3, 0.4, or 0.5) of a full-time equivalent depending upon the number of

---

[1] Canadian Classification and Dictionary of Occupations, No. 3134-110, 1980.

hours worked. For purposes of this report, part-time nursing assistants have been calculated to represent 0.4 of a full-time equivalent for the provinces of British Columbia, Alberta and Saskatchewan. This is believed to be the status quo, but this key assumption could not be validated. In Manitoba, government representatives believe that part-time nursing assistants represent 0.5 of a full-time equivalent and this assumption has been used in all calculations for the Province of Manitoba throughout this report.

Limitations of the Data

As indicated earlier, difficulties were encountered because of the lack of a consistent, historical data base for the nursing occupations. The data base available on nursing assistants had serious limitations. In Alberta, for example, the Alberta Association of Registered Nursing Assistants includes nursing attendants, operating room technicians, orthopedic technicians, child care workers and ambulance attendants, as well as registered nursing assistants. In British Columbia, the Licensed Practical Nursing Association is believed to represent only 20% of the total number of practical nurses registered in that province. Similarly, in Manitoba, less than 40% of the practical nurses were members of their professional association prior to 1980. However, since July 1980 the M.A.L.P.N. has become the licensing body for practical nurses. Because of these deficiencies, there are serious concerns about the accuracy of the input data which was used to develop both the supply and requirement projections.

Net Occupational Shift Factor

One of the most important factors affecting the projected supply of nursing assistants in western Canada is the net occupational shift factor. This factor has been defined as the net movement of nursing assistants from active to inactive status or from inactive to active status; movement into the profession from another profession or movement out of the active nursing profession to another profession; and attrition due to death or retirement. Historically this factor has been erratic, but the reasons for this are not known. In developing the supply projections contained in this report, two net occupational shift values were used to demonstrate the extreme sensitivity of this factor. The factors of -8% (approximating a 12 year working life for

each full-time equivalent) and -10% (approximating a 10-year working life for each full-time equivalent) were selected as a reasonable range on which to develop the supply projections contained in this report following discussions with professional associations and nursing employers. There is no information available to validate this key assumption. Because of the extreme sensitivity of this key factor and the lack of validated evidence to support the selection of the -8% or -10% value used, the supply projections contained in this report should be viewed with some caution. For a detailed discussion of the net occupational shift factor, refer to Appendix B.

In this report, projections have been made on both supply and requirement from 1981 through to the year 2000. For planning purposes, however, it would be prudent to focus on the 1981-1985 timeframe, because of the difficulties associated with making informed judgements on the basis of the limited data now available and because of the occupational issues now facing the nursing assistant profession, which are discussed later in the report.

REPORT FORMAT

A series of working papers specific to this occupation was prepared and submitted to the Steering Committee. These working papers included:

- calculation of full-time equivalents for the historical supply of nursing assistants (1975-1980),
- scope of existing training programs for nursing assistants in western Canada.
- preliminary findings regarding historical and projected supply and requirement, and
- preliminary training recommendations.

The general background of the study on the nursing assistant occupation has been provided in this section of the report. Section II summarizes the projections of the future supply and requirement for nursing assistants in western Canada and the timing and location of these manpower requirements in

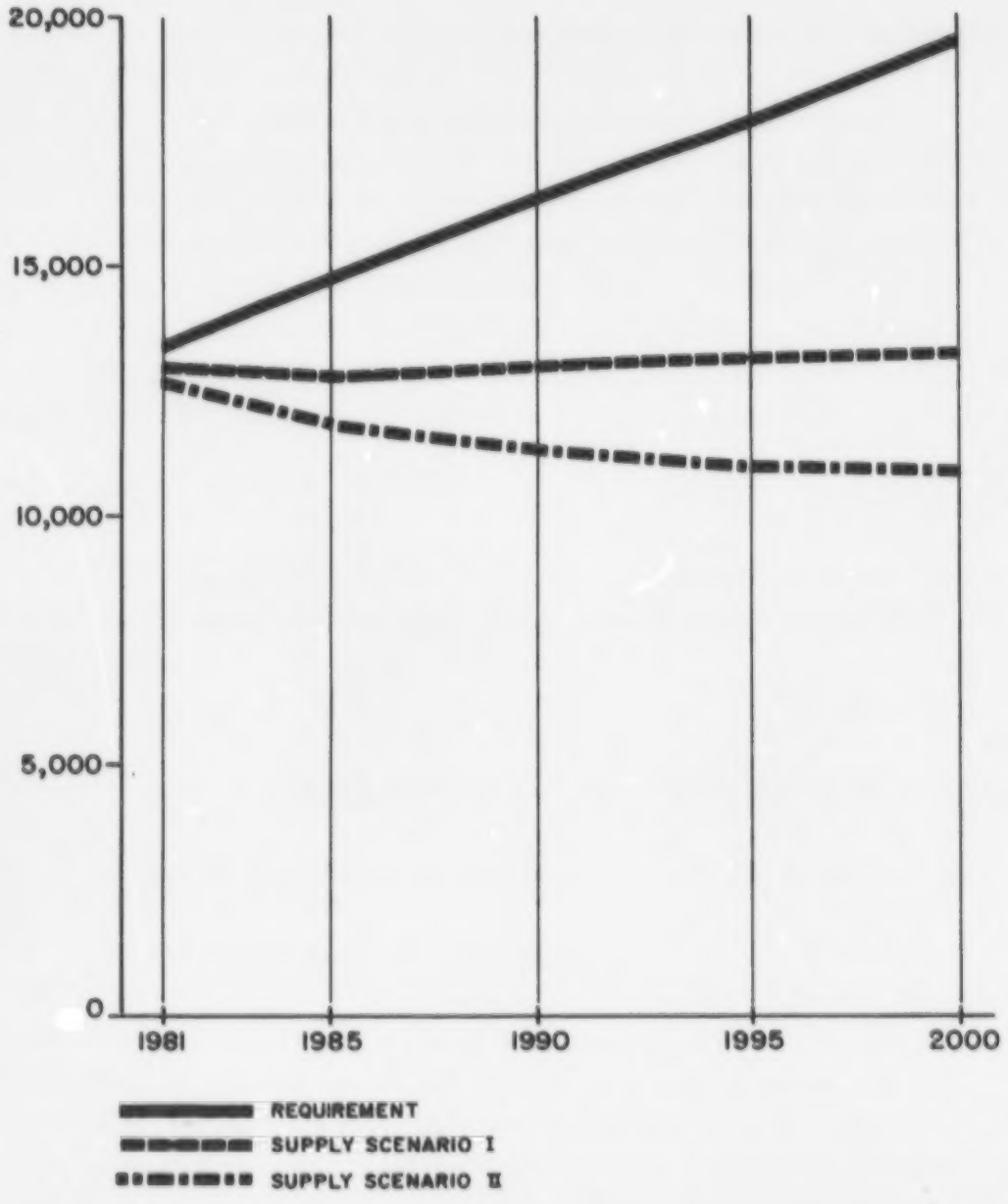
each province.

Section III examines present and future manpower strategies and the occupational issues affecting on the supply and requirement for nursing assistants. Three alternative manpower strategies are assessed. Section IV contains recommendations for this occupation. Three appendices provide further supporting detail as follows:

- Appendix A - Study Approach and Methodology;
- Appendix B - Provincial Net Manpower Requirements;
- Appendix C - Bibliography.

EXHIBIT I

PROJECTED SUPPLY AND REQUIREMENT FOR F. T. E. NURSING ASSISTANTS IN THE WESTERN REGION



II - PROJECTED SUPPLY AND REQUIREMENT FOR NURSING ASSISTANTS IN THE WESTERN REGION

This section summarizes the projections of the supply and requirement for full-time equivalent nursing assistants in the western region and the timing and location of these manpower requirements on a provincial basis. Further details of the methodology used and the assumptions made in developing the most likely supply and requirement projections for each province are contained in Appendices A and B.

WESTERN CANADA OVERVIEW

Exhibit 1, opposite, shows two projected supply scenarios and a projected requirement for full-time equivalent nursing assistants in the western region from 1981-2000. The supply projection shown as Scenario I in Exhibit 1 is based on a net occupational shift factor of -8% (or an average working life of 12 years). Scenario II is based on a net occupational shift factor of -10% (or an average working life of 10 years). Exhibit 1 indicates that the projected supply will remain relatively stable at approximately 13,000 full-time equivalents from 1981 to the year 2000 under Scenario I. Under Scenario II, the projected supply will decrease from approximately 13,000 in 1981 to 11,000 in the year 2000. Over the same timeframe, the requirement or demand will increase from 13,000 to 19,500 full-time equivalents in the year 2000.

Based on these projections, the net requirement or shortage of full-time equivalent nursing assistants is estimated to be in the order of 400 to 600 in 1981 and increases to 6,000 to 8,000 by the year 2000. These two supply scenarios indicate the extreme sensitivity of the supply projections and net requirements to the net occupational shift factor.

The factors used to develop these projections are set out below.

Projected Supply

The projected supply scenarios shown in Exhibit 1 are based on an analysis of the output from a computer program used for this study.

The "opening stock" figure represents the number of active full-time equivalent nursing assistants in each province in 1980. This figure was determined using data provided by the respective nursing assistants' associations. The breakdown between full-time and part-time active nursing assistants was estimated to be approximately 60% full-time and 40% part-time. Each part-time nursing assistant in British Columbia, Alberta and Saskatchewan was estimated to represent 0.4 full-time equivalent. In Manitoba, each part-time nursing assistant was estimated to represent 0.5 full-time equivalent. It was assumed that the breakdown between full-time and part-time would remain unchanged, although there is no evidence to support or contradict this assumption.

Based on the opening stock figure developed, the computer then added or subtracted a numerical or percentage value assigned to each of the following supply factors:

- net migration - defined as the movement of nursing assistants from one province to another province. Migration into each province was subtracted from migration out of that province to arrive at a net migration factor.

- net immigration - defined as the movement of nursing assistants from one country to another country. The number of emigrants from each province was subtracted from the number of immigrants to that province to arrive at a net immigration factor.

- training output (entry-level) - defined as the number of anticipated graduates from basic or entry-level programs for nursing assistants in each province. Each entry-level training output was assumed to represent one full-time equivalent.

- net occupational shift - defined as the net movement of full-time equivalent nursing assistants from active to inactive status or from inactive to active status; movement into the profession from another profession or movement out of the active nursing profession

to another profession; and attrition due to death or retirement.

Values were assigned to each of these key factors based on historical trends revealed through analysis of the data from the respective nursing assistants' associations, interviews with association and government spokesmen, and a review of literature and recent studies.

Net migration and net immigration values were obtained through a review of nursing association historical data from 1975-1980. The data base available reflects only those nursing assistants who have requested verification of their status with provincial associations. The degree of participation of these migrants or immigrants in the workforce (as part-time or full-time workers) was unknown. However, it is believed to be reasonable to assume that since these professionals had requested active registration status, they were likely to enter the workforce. No data was available to substantiate this assumption. Similarly, no data was available to support or contradict the assumption that the historical trend in net migration and net immigration would continue from 1981-2000.

No factual information was available on the proportions of entry-level training outputs entering the active workforce on a full-time or part-time basis. It seemed reasonable to assume, however, that a new graduate from an entry-level program would enter the workforce on a full-time basis. There is no information available to validate this assumption.

The percentage values used for the net occupational shift factor approximates an average working life of full-time equivalent nursing assistants. For example, if the net occupational shift is assumed to be -8%, this would approximate a 12 year working life. A nursing assistant who works 6 years full-time and 12 years part-time at 0.5 full-time equivalent would have a 12 year working life. If that same nursing assistant had worked 6 years full-time and 12 years part-time at 0.4 full-time equivalent, she would have an average full-time equivalent working life of 10.8 or 11 years.

Because of the lack of validated data with respect to the net occupational

shift factor, a number of sensitivity analyses were undertaken to assess the impact any percentage change would have on the future supply projections. These analyses included a net occupational shift factor of -5% (20 year working life), -6.5% (15 year working life), -8% (12 year working life), -10% (10 year working life), and -12.5% (8 year working life). Based on discussions with professional associations and nursing employers, -8% and -10% net occupational shift were selected as a reasonable range on which to base supply projections. The supply projections are extremely sensitive to the net occupational shift factor and the lack of factual, validated information on this factor must be taken into consideration when examining the projected net requirements. It cannot be over emphasized that this key factor significantly impacts the projected supply scenarios. Net occupational shift factors of -8% and -10% were selected as being the two most likely scenarios for this report, but there is no information available to validate this key assumption.

The two supply projections, as shown in Exhibit 1, are as accurate as can be achieved in light of the lack of historical data and the key assumption made with respect to future supply projections. Because of the lack of a validated historical data base and the extreme sensitivity of the projections to the net occupational shift factor, attention should be focused on the supply projections during the 1981-1985 timeframe.

Projected Requirement

Three methods of determining future requirements for health occupations in western Canada were considered for this study. These included:

- Service target method;
- Population ratio method;
- Service utilization method.

The methodology for each of these methods is set out in Appendix A. The service target method implies that a target ratio of full-time equivalent nursing assistants has been developed. As there are no defined service target ratios for nursing assistants in western Canada or elsewhere, this approach was not

used. The population ratio method was not used because reliable historical data on full-time equivalents was not available, and there is also some question whether the current ratio of nursing assistants to population is an appropriate or adequate ratio on which to base future levels of requirement.

The projected requirement for full-time equivalent nursing assistants as set out in Exhibit 1 was therefore based on the service utilization method. This method projects the number of active treatment patient days and the number of full-time equivalent nursing assistants required to meet this level of service in future, based on medium population growth. This approach makes four key assumptions. It assumes that:

- the number of full-time equivalent nursing assistants to the number of patient days in 1980 will be an acceptable level of service in future;
- the pattern of utilization of hospital beds by age and sex cohort in 1980 will remain the same in the future;
- there will be no major changes in technology or productivity which will impact on the future requirement for nursing assistants;
- active treatment hospital beds will be available in the western region to meet the projected number of patient days and the resulting requirement for nursing assistants in the timeframe shown.

There was little historical information on which to assess past trends in the utilization of nursing assistants. It has been suggested, however, that the ratio of full-time equivalent nursing assistants to patient days in recent years has been less than ideal, but there was no information available as to what increased level of service would be considered adequate. The level of requirement projected in this report assumes the current proportion of nursing assistants, registered nurses and other occupations will remain unchanged. If hospital staffing patterns move towards using only registered nurses, less full-time nursing assistants equivalents would be required. Conversely, if there is a prolonged shortage of registered nurses, significantly more nursing assistants could be required. (This is not to suggest that nursing assistants could perform all registered nurse duties, but rather to suggest that if there was a severe or prolonged shortage of registered nurses more nursing assistants might be used to support fewer registered nurses.) The need for the nursing assistant occupation is currently a major occupational issue. It has been suggested that two levels of nursing be established in Canada (a baccalaureate nurse and a technical, or diploma-prepared, registered nurse)

and that the nursing assistant occupation could be eliminated. In the requirement analyses in this study, it was assumed that no major change will occur in the utilization of nursing assistants.

The requirement projection shown in Exhibit 1 is as accurate as can be achieved in light of the key assumptions which have been made. As in the supply projections, it would be prudent to focus on the requirement projected over the 1981-1985 timeframe.

Net Requirement

The projected supply minus the projected requirement equals the net requirement for full-time equivalent nursing assistants in the western region. Based on the foregoing analysis, the net requirement or shortage of full-time equivalent nursing assistants will be in the following range:

TABLE 1

PROJECTED NET REQUIREMENT FOR NURSING ASSISTANTS
IN WESTERN CANADA 1981 - 2000
(Full-Time Equivalents)

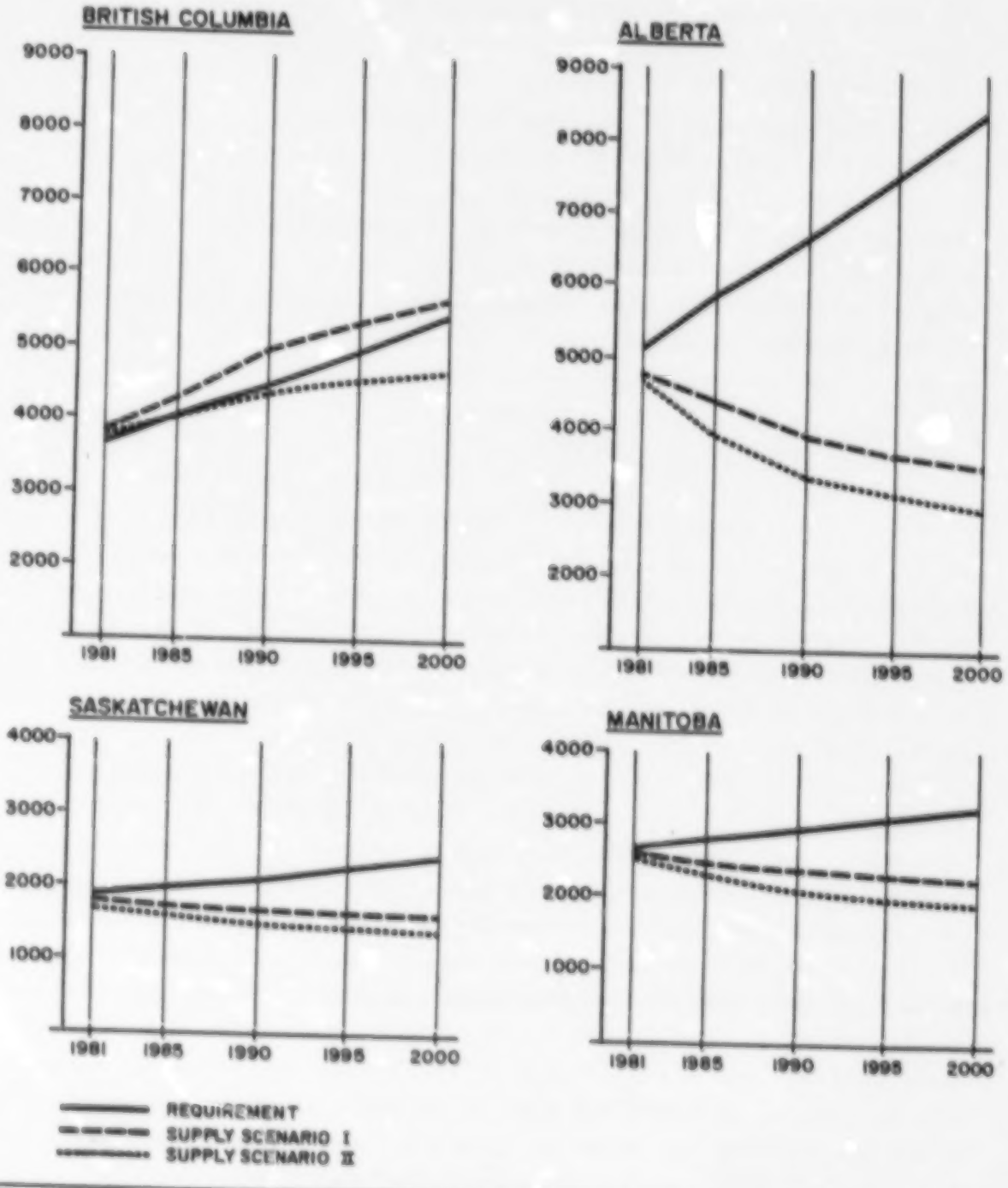
Year	Scenario I Using the -8% net occupational shift factor	Scenario II Using the -10% net occupational shift factor
1981	400	600
1982	700	1,200
1983	1,100	1,800
1984	1,400	2,300
1985	1,800	2,800
1990	3,300	5,000
1995	4,900	6,900
2000	6,500	8,700

Note: All numbers have been rounded to the nearest hundred.

The importance of the full-time equivalent factor cannot be overemphasized. For example, the range of net requirements shown in Table 1 is based on a 60% full-time and 40% part-time workforce, with each part-time nursing assistant representing 0.4 or 0.5 of a full-time equivalent. In order to make up one full-time equivalent with part-time nursing assistants working 0.4, 2.5

EXHIBIT 2

PROJECTED SUPPLY AND REQUIREMENT FOR F. T. E. NURSING ASSISTANTS



active nursing assistants would be required. If each part-time nursing assistant represents 0.5 full-time equivalent, 2.0 active nursing assistants would be required. A projected net requirement of 1,800 - 2,800 full-time equivalents in 1985 would therefore translate into a shortage of approximately 3,000 - 4,500 active nursing assistants in western Canada.

Clearly this requirement for additional nursing assistants reflects a severe problem for the western region in the short term, and the long range projections indicate a significant shortage. As indicated earlier, the requirement projections assume an unchanged relationship between the proportion of nursing assistants and registered nurses. In a separate report, a more severe projected shortage of registered nurses in the 1981-1985 timeframe has been documented and this could have a significant impact on the increased short-term requirement for nursing assistants in western Canada.

TIMING AND LOCATION OF MANPOWER REQUIREMENTS

In order to examine in more detail the timing and location of these projected shortages, projections of supply and requirement in each of the four western provinces have been set out in Exhibit 2, opposite. As in the previous Exhibit, two supply projections are shown. Scenario I assumes a -8% net occupational shift factor or an average working life of 12 years for each full-time equivalent nursing assistant. Scenario II assumes a -10% net occupational shift or an average working life of 10 years.

British Columbia

In Scenario I, the graph indicates that British Columbia is presently experiencing a minor surplus of full-time equivalent nursing assistants. Over both the short and longer-term, British Columbia would be in a minor surplus situation ranging from 100 to 500 full-time equivalents. It has been suggested that many British Columbia hospitals are reducing the proportion of nursing assistants to registered nurses and that hospitals are not hiring new nursing assistant graduates. In light of the projected shortage of registered nurses in British Columbia, however, there may be a reversal of this trend

which would eliminate the minor surplus of nursing assistants.

In Scenario II, British Columbia would be in a balanced manpower situation and this projected balance between supply and demand continues from 1981 through to 1985. In 1986, a minor shortage is projected and this shortage grows from 200 in 1990 to 800 in the year 2000. It would be prudent to regard these longer term projections with caution, in light of the weak data base used to develop the supply and requirement projections.

The requirement projections assume a moderate increase in population, and an unchanged pattern of utilization of nursing assistants over the twenty year timeframe. British Columbia presently has a positive net migration and net immigration of nursing assistants, and it was assumed that this historical trend would continue.

Alberta

The requirement for nursing assistants in Alberta is projected to increase substantially, based on the anticipated growth in population over the next twenty years. Medium population growth projections were used to derive the requirement for nursing assistants. Based on planned construction of new hospital beds, the level of requirement shown may somewhat underestimate the actual requirement for nursing assistants in the short-term. It should be noted, however, that during the period 1972-1980, the trend in Alberta was to the decreasing utilization of registered nursing assistants and a dramatic decline in the utilization of orderlies in acute care settings. It also appears that four large urban hospitals may utilize few, if any, registered nursing assistants. Since 1980 was used as the base-year for making supply projections, this decreased utilization would have been taken into account. A serious concern, however, is whether this trend in decreasing utilization will continue in future. Alberta is also facing a projected shortage of registered nurses and this could significantly increase the level of requirement for nursing assistants indicated in these projections. On the other hand, a shortage of supervisory registered nurse personnel implies a limitation on the supply of nursing assistants if no other personnel are available to supervise the registered nursing assistants.

In Scenario I, Alberta is presently experiencing a shortage of full-time equivalent nursing assistants, and this shortage increases from approximately 300 in 1981 to 1,500 in 1985.

In Scenario II, the shortage is more severe and increases from approximately 400 in 1981 to 1,900 in 1985. Under either scenario, the Province of Alberta faces a severe nursing assistant manpower shortage in the short term, and this continues unabated to the year 2000 when there would be a projected shortage of approximately 5,000 to 6,000 full-time equivalents.

Saskatchewan

The level of projected requirement for full-time equivalent nursing assistants in Saskatchewan over the next twenty years increases very moderately. However, the projected supply decreases from 1,800 in 1981 to 1,400 in the year 2000. In part, this reflects the net occupational shift factors assumed to develop the supply scenarios, also, Saskatchewan has a negative migration of nursing assistants out of the Province. In recent years, the level of migration out of the province has equalled or possibly even surpassed the level of training output. Saskatchewan has the lowest level of training output in the western region.

In Scenario I, the graph indicates that Saskatchewan has a balanced manpower situation, but by 1983 a minor shortage of 100 full-time equivalents is projected and this shortage increases in 1990 from approximately 400 to 800 in the year 2000.

In Scenario II, a shortage is projected of approximately 200 in 1982 and this shortage increases to 500 in 1985. Under either scenario, the Province of Saskatchewan faces a minor shortage situation in the short term, and in the longer term there would be a shortage of approximately 800-1,000 full-time equivalents.

Manitoba

As in Saskatchewan, the projected requirement for nursing assistants in Manitoba increases moderately over the next twenty years. Manitoba also has a

negative migration factor which reduces the projected supply of full-time equivalents. Manitoba is currently facing a projected shortage of nursing assistants, and in a separate report a projected shortage of registered nurses over the 1981-1985 timeframe has been documented. Even minor shortages in nursing assistants, therefore, represent a significant concern for Manitoba in the short term because of the strong inter-dependence of these two professions.

In Scenario I, Manitoba is currently experiencing a minor shortage of full-time equivalent nursing assistants, and this shortage increases from approximately 100 in 1981 to 300 in 1985. This projected level of minor shortages, however, may be misleading as there are seasonal and geographic variations in requirements.

In Scenario II, Manitoba is currently experiencing a larger shortage and this shortage grows from approximately 100 full-time equivalents in 1981 to 500 in 1985. Over the longer term, this shortage grows to 1,300 full-time equivalents by the year 2000.

SUMMARY

Based on the projected supply scenarios and projected requirement shown in Exhibit 2, the net requirement for full-time equivalent nursing assistants in each province is as follows:

TABLE 2
PROJECTED NET REQUIREMENT FOR FULL-TIME EQUIVALENT NURSING ASSISTANTS

	British Columbia		Alberta		Saskatchewan		Manitoba	
	Scenario I	Scenario II	Scenario I	Scenario II	Scenario I	Scenario II	Scenario I	Scenario II
1981	-100	0	300	400	0	0	100	100
1982	-200	0	600	800	0	200	200	200
1983	-200	0	1000	1200	100	200	200	400
1984	-300	0	1200	1600	200	300	300	500
1985	-300	0	1500	1900	200	400	300	500
1990	-500	-200	2800	3300	400	600	600	900
1995	-400	-400	3800	4500	600	900	800	1100
2000	-300	-800	4900	5600	800	1000	1000	1300

Note: All numbers have been rounded to the nearest hundred. A minus sign indicates a surplus.

The projected net requirement for full-time equivalent nursing assistants represents a minor shortage in the short term which will gradually increase in the longer term. In reviewing these projections, it is important to note that the assumptions are based on weak data. In fact, the data base for the nursing assistant occupation was considerably less reliable than that available for the registered nurse occupation and serious concerns have already been indicated about its accuracy.

Another major area of concern is the relationship between nursing assistants and registered nurses. That is, a minor shortage of nursing assistants has a substantial impact on the requirement for registered nurses. In a separate report, supply projections for the registered nurse category indicated a shortage in the short term and greater shortages over the longer-term. Although the size of the projected shortages of nurses assistants is not large, this nursing occupation is facing a shortage according to the projections contained in this report.

The projections shown in Table 2 under Scenario I and II represent the best estimates that can be made in light of the limited data base now available. The supply projections shown in this report represent what we believe is a "best guess" without any hard, factual evidence to support the critical net occupational shift assumption. The requirement projection has been made without the benefit of a detailed assessment of how impending changes in the delivery of nursing care would impact upon requirements and we have been unable to validate whether the level of requirement indicated will materialize at the precise timeframes indicated. We would, therefore, caution the reader of this report to focus on the projections indicated during the 1981-1985 timeframe and to exercise caution in interpreting the shortages projected. Further details on the methodology, the net provincial requirements, and the level of confidence in the data used to develop the assumptions are set out in Appendixes A and B.

In the following sections, the present and alternative manpower strategies required to address the projected shortages over the short term, 1981-1985, are examined.

EXHIBIT 3

TRAINING PROGRAM OUTPUTS OF NURSING ASSISTANTS IN WESTERN REGION IN 1981

	BRITISH COLUMBIA	ALBERTA	SASKATCHEWAN	MANITOBA	WESTERN REGION TOTAL
Community College Programs	382 (7)*	280 (2)	150 (2)	131 (3)	943 (14)
Hospital-based Programs				87 (1)	87 (1)
Total	382 (7)	280 (2)	150 (2)	218 (4)	1,030

* Number of programs are shown in brackets

Source: PMP Survey of educational authorities in each province.

III - PRESENT AND FUTURE MANPOWER STRATEGIES

This section examines the major factors influencing the present and future supply of nursing assistants in the western region. These factors are discussed under the headings of training programs and occupational issues. The latter encompasses those issues which may influence decisions by nursing assistants to leave or to re-enter the workforce and decisions by potential candidates to enter training programs. Finally, the impact of three alternative manpower strategies to address the projected shortage over the next 5 years are assessed.

EXISTING TRAINING PROGRAMS

Increasing the number of graduates from training programs is a traditional method of increasing the supply of nursing assistants. It is unlikely that this approach will be as successful in the future as it has been in the past. This section summarizes the review of existing training programs for nursing assistants in the western region. (A more detailed discussion of these training programs is outlined in the report "The Scope of Existing Training Programs - Category 4 Occupations").

Exhibit 3, opposite, shows the anticipated or planned output of graduates from basic or entry level training programs in each province in 1981. There are fifteen training programs in western Canada with the potential to graduate approximately 1,000 nursing assistants per annum. This level of output is expected to remain relatively constant over the next 5 years; assuming that there are qualified applicants entering the programs in the same numbers in future years.

Basic training (or entry-level training) is provided at community colleges and at hospitals. The program length ranges from 10 to 11 months. The total enrollment quotas have remained relatively stable over the last decade. However, the number of applicants to these programs has fluctuated with a decrease in the last five years. The number of students accepted into the

programs has decreased, and in some cases, it is believed that enrollment quotas are not being filled due to the lack of qualified applicants. This situation is not true of Manitoba community college programs where the nursing assistant certificate course has been a high demand course in recent years. The number of graduates out of these programs in the western region is approximately 11% to 27% less than enrollment figures, with attrition rates varying among each individual educational institution. Saskatchewan appears to have the highest attrition rate (27%) and Manitoba has the lowest (11%). (Manitoba community colleges had completion rates of greater than 80% for the Nursing Certificate I program during the period 1979-1981.)

There are no upgrading programs to allow other health workers (such as nursing aides) into the nursing assistant profession. However, graduates of the nursing assistant program at Douglas College in British Columbia, at Red River Community College in Manitoba and in Saskatchewan can alternatively transfer into the second year of the registered nurse diploma program. (This effectively means upgrading out of the nursing assistant profession.) Similar career ladders for registered nursing assistants are not available in Alberta. The absence of a career ladder could lead to the perception of the nursing assistant as a dead-end occupation and could potentially deter immigrants from moving to an area where upgrading is not available.

There are no refresher training programs currently available for nursing assistants. It is unclear whether this unavailability of refresher training reduces the likelihood of inactive nursing assistants re-entering the workforce, or whether the lack of demand for this type of program indicates that it is considered unnecessary for this occupation.

OCCUPATIONAL ISSUES

Many of the occupational issues affecting the present and future supply and requirement for nursing assistants in the western region parallel those facing the nursing profession as a whole. The major issue facing the nursing assistant profession is the future viability of the occupation itself and this is discussed later in the section. There has been little or no research done on the occupational issues facing nursing assistants specifically. However, it is believed that those issues facing the nursing profession as a whole are applicable to nursing assistants as well. These issues will have a severe

impact on future manpower strategies for this occupation. The major occupational issues influencing each of the following are set out below:

- retention of the current supply of active nursing assistants;
- recruitment of inactive nursing assistants back into the active workforce;
- recruitment of students into training programs for nursing assistants; and
- requirement for, and future utilization of, nursing assistants.

The viability of the nursing assistant occupation is a major occupational issue. A question being posed by some is whether efforts should be directed to attempt to retain the current supply of nursing assistants, to continue to train new nursing assistants, and to recruit inactive nursing assistants back into the workforce. Is the nursing assistant occupation viable over the short and longer term? Some have suggested that it is not and that a two-tier nursing structure should be phased in (baccalaureate degree nurses and diploma nurses). Others have suggested that the profession will eventually be phased out because hospitals will move towards increased utilization of registered nurses because of their greater skill base and flexibility. Spokesmen for the nursing assistant profession counter these arguments by suggesting that the work currently performed by nursing assistants is a valued component of total nursing care and that their bedside nursing skills are much needed and welcomed by patients. This study precluded an analysis of the viability of the nursing assistant occupation per se, however, in light of the projected shortages of registered nurses documented in a separate report it is difficult to envisage how the nursing assistant occupation could be phased out in the short term (1981-1985). There may be a trend towards decreased utilization of nursing assistants, but the likely extent or magnitude of this change is unknown and could not, therefore, be quantified.

Retention of Current Supply

The retention issue applies to both retention of the existing supply in the nursing profession and retention of nursing assistants in particular employment settings.

The average working life of a nursing assistant is relatively short. Based on the review of the literature and interviews with professional associations, it is estimated that the average working life of a nursing assistant is between 10 and 12 years. There is no evidence to support this assumption. The rate of participation of nursing assistants in the workforce is believed to be lower than that in other female dominated occupations (such as teaching). Studies done in other regions have indicated that there is not presently a shortage of trained nurses, but rather a shortage of nurses willing to participate in the active workforce. This situation probably also prevails in western Canada with respect to nursing assistants, but there is no factual evidence available to quantify the extent of this problem. (For a more detailed discussion on average working life and the net occupational shift assumption, refer to Appendix B.)

There is a high turnover rate among nursing assistants in institutional settings. It has been suggested that turnover rates may be less than that of registered nurses. Many nursing employers were unable to substantiate whether this is true. It is generally believed that the factors affecting the retention of nursing assistants and registered nurses in both the profession and in particular positions or employment sectors, fall into four major categories:

- educational factors including:
  - the educational experiences which affect the nurse's job expectations;
  - factors affecting the relationship between education and practice of nursing; and
  - the availability and accessibility of on-going education.
- organizational practices and human resource management factors which affect the nature of nursing jobs including the opportunity to:
  - employ a full range of skills;
  - undertake whole or meaningful components of patient care;

- use discretion in work methods;
- receive adequate feedback;
- experience professional growth; and
- realize career mobility.

- employment factors which affect working conditions including:

  - compensation and benefits
  - scheduling and rotation;
  - transportation;
  - work place amenities, etc.

- social and economic factors including:

  - family responsibilities;
  - mobility of spouses;
  - role of women;
  - interest rates;
  - unemployment rates; and
  - consumer price index.

Employment factors and social and economic factors have thus far been the primary focus of attempts to increase the retention of active nurses in the workforce. It is now believed, however, that future retention and recruitment strategies should attempt to address the educational and organizational and human resources management factors.

Historical patterns of migration and immigration of nurses in western Canada may change in the future. The North American nursing labour pool is relatively mobile and shortages of active nurses are projected in other parts of the country. Recruitment or retention strategies developed and implemented in eastern Canada or in the United States may have a more severe impact on the retention of the current or future supply of active nurses in western Canada than in the past.

Career choices available to women have significantly expanded in recent years. Thus, the retention of the current supply of nurses may be more difficult, and many nursing assistants may leave the profession and current employment settings. This may also make recruitment of qualified applicants into nursing assistant training programs more difficult. On the other hand, some have suggested that there are few careers available requiring less than one year of formal training and this may result in a continuing interest in the nursing assistant occupation.

Recruitment of Inactive Nursing Assistants

It is generally believed that there are a large number of inactive nursing assistants who might conceivably be attracted to re-enter the active workforce. The size, age structure or geographic location of this inactive labour pool is unknown. The likelihood of this group returning in significant numbers on a full-time or part-time basis is also unknown. Recent experience with refresher programs for registered nurses in western Canada indicates that re-entry to the active workforce by registered nurses is on a part-time basis. (This situation is apparently not true in Manitoba where 90% return on a full-time basis.) Attempts to recruit large numbers of inactive nurses into the active workforce in the United States have not proven as effective as had been hoped. The success of employers in retaining nurses who have re-entered the active workforce for extended periods of time has not been sufficiently studied, however, it is believed that the retention rate is poor.

There is little information available to suggest that inactive nursing assistants are more/less likely to re-enter the active workforce than registered nurses. A major problem in researching this issue, as well as the other occupational issues contained in this section, is that there has been little attention paid to nursing assistants by researchers in the past. Some nursing employers have suggested that nursing assistants are a more stable workforce; others have suggested that the problems affecting recruitment of inactive nursing assistants parallel those facing registered nurses.

It appears that successful re-entry to the active workforce by registered nurses is somewhat linked to the availability and accessibility of good

orientation programs and refresher training that allows a nurse to gain confidence in his/her abilities and competence when returning to the workforce. It is not known whether there is a need for this type of program for nursing assistants. There are no refresher training programs currently available for nursing assistants in western Canada, and it is not known whether there is a need or demand for such programs. (It should be noted that there are no legislative or re-registration criteria which would impede nursing assistants from re-entering the workforce.)

Recruitment of Students into Training Programs

The attrition rates from nursing education programs, and the experience of some educational institutions in which enrollment quotas are not filled due to a lack of qualified applicants, suggests that recruitment into the nursing professions generally is now, or will be in the future, a problem in other areas. The lack of qualified applicants for nursing programs of all types is viewed as a serious concern in the United States presently, and there are indications that this problem is increasing in other parts of Canada. It appears that this is not currently a problem in western Canada, however, we believe that this situation should be carefully monitored over the next several years. The nursing assistant programs are of short duration (less than 1 year) and salaries are currently only marginally lower than those paid to registered nurses who complete a 2-year program (or longer). This could mean that nursing assistant programs would be viewed as an attractive alternative to registered nurse programs. On the other hand, those factors contributing to a decline in nursing programs in other areas could mean that all nursing training programs would experience a decline in demand. Nursing is, for the most part, still regarded as an occupation primarily suitable for women and efforts to attract males into nursing training programs have not been successful.

The image of nursing as a profession may in future impede the recruitment of qualified high school graduates into entry-level training programs. It has been suggested that nurses view nursing as a series of episodic jobs rather than as a career, and this image of the profession may make it less appealing to career-oriented young women in the future and may also reduce the likelihood of recruiting males into the profession. Studies have been

conducted on the image of registered nursing as a profession, but no studies have been undertaken to identify whether the image of the nursing assistant occupation is impeding recruitment of qualified high school graduates.

Requirement for Nursing Assistants

The projections contained in this report assumed that the current proportions of nursing assistants to registered nurses will remain unchanged and that there will be no major change in utilization of nursing assistants. The requirement for nursing assistants may be significantly greater than anticipated if there is an under-supply in other types of nursing personnel (including registered nurses, nursing aides, psychiatric nurses, etc.) In a separate report, a large shortage of registered nurses in both the short and longer term has been documented. A trend to increase the proportion of nursing assistants to registered nurses would significantly increase the shortages of nursing assistants indicated in this report. (This is not to suggest that nursing assistants could replace registered nurses, but rather that if there was a severe or prolonged shortage of registered nurses, it is conceivable that more nursing assistants might be used to support fewer registered nurses.)

Because of the current relatively minor wage difference between registered nurses and nursing assistants, it has been suggested that the requirement for nursing assistants may be reduced in future. Recent trends have indicated that fewer nursing assistants are being employed because registered nurses have a broader skill base and can perform more complex tasks. This trend may not continue in the future in light of the projected shortage of registered nurses. It has also been suggested that the nursing professions are becoming increasingly more complex and that there is a need for nursing assistants to receive more advanced training which would allow them to accept greater responsibility in the provision of health care. Longer training programs could also result in an increased requirement for nursing assistants in the short-term.

Another factor which would influence the number of full-time equivalent

nursing assistants required would be a decrease in the number of hours worked by each part-time worker or a percentage increase in the number of nursing assistants working part-time. It has been suggested that many part-time workers would prefer to work fewer shifts. Thus, as salaries increase and the general economy improves, there may be a trend towards working less hours per week.

By and large we have had to rely on the informed opinions of association spokesmen and nursing assistant employers interviewed in western Canada to identify the occupational issues facing this profession. In most cases, it was difficult to obtain substantiated evidence that identified unique issues facing nursing assistants. However, the major question facing the occupation relates to whether or not the profession will continue to be utilized to the same extent in future, in relation to registered nurses. The factors affecting this have been identified in this section, but we are unable to quantify the likely extent of this future change in utilization.

ALTERNATIVE MANPOWER STRATEGIES

The preceding discussion has indicated that there is a projected shortage of active nursing assistants in the western region and that there are significant occupational issues affecting the recruitment and retention of nursing assistants. In the following sections, three alternative strategies for addressing this projected shortage are examined:

Strategy A - Increase training outputs to meet projected shortages.

Strategy B - Develop and implement retention and recruitment strategies to reduce the net occupational shift.

Strategy C - Increase training outputs and develop and implement retention and recruitment strategies to reduce the net occupational shift.

Strategy A - Increase Training Outputs

Some of the traditional approaches used to meet projected shortages of manpower requirements are to increase the size or number of training programs,

reduce their length, or reduce their attrition rates. Other approaches might include changing the entrance requirements to training programs to facilitate the acceptance of larger numbers of candidates.

There has been some concern in the profession in the past with regard to the ability of educational institutions to attract appropriately qualified applicants into entry-level training programs. The most recent experience in western Canada indicates that this is not a current problem, however, we believe that this situation should be carefully monitored in future in light of the experience being reported in eastern Canada and in the United States. The opportunity to meet significant projected shortages through large increases in training output may not be realistic over the longer term. It is also questionable whether the expenditure of education dollars for this purpose would be efficient. It is unlikely that the length of entry-level training programs could be significantly reduced. Similarly, reducing the entrance requirements to training programs (below the high school graduation level) is unlikely to be practical or effective.

In developing Strategy A, a one-third increase over the planned level of entry-level outputs was selected as being a reasonable target to be achieved over the longer term. A western region increase of training outputs by one-third assumes that:

1. The present attrition rate of training programs (ranging from 11% to 27%) could be reduced.

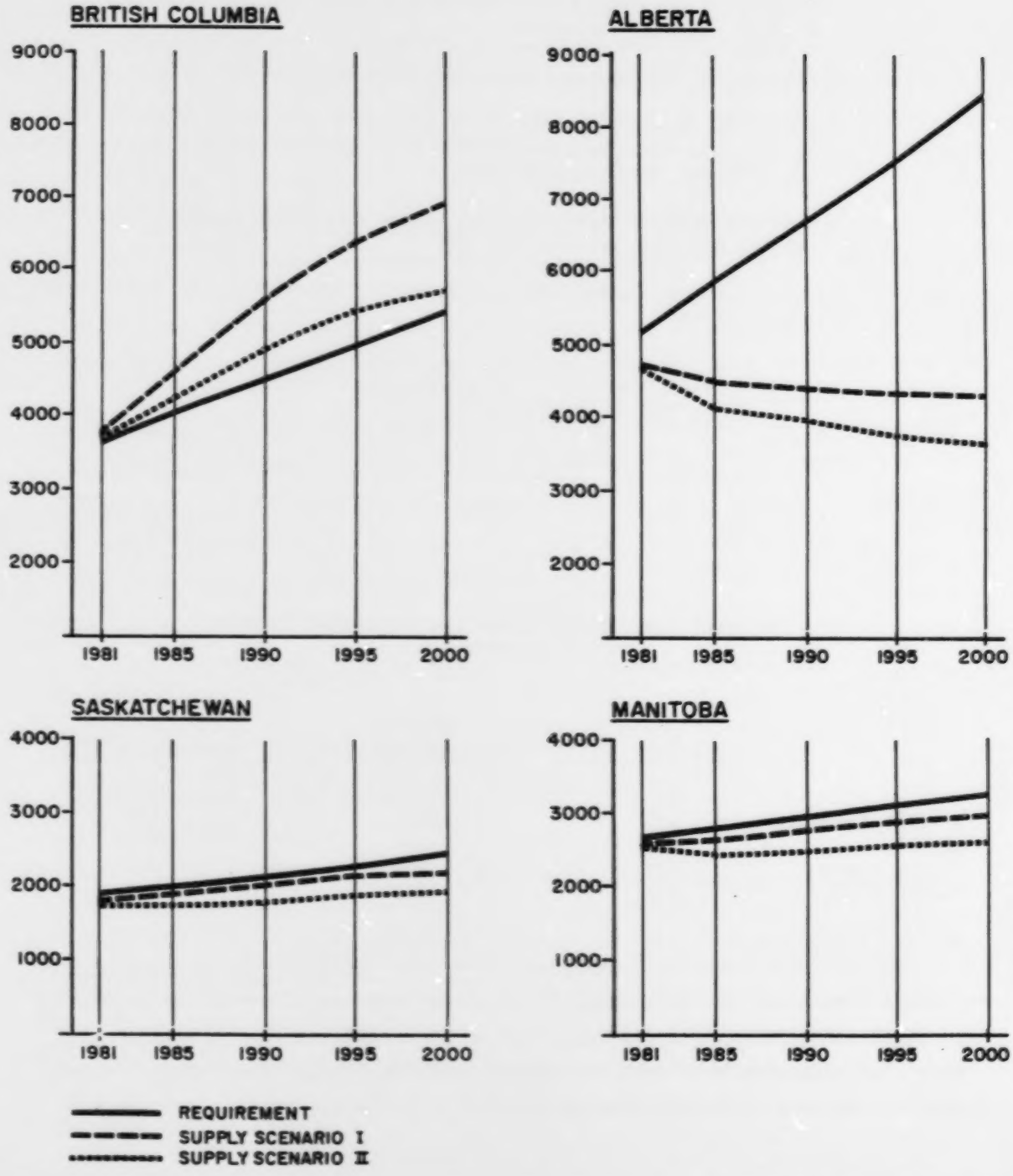
2. Programs could be made attractive enough to qualified applicants so that there would be an increase in applications and an increase in the number of students accepted into existing training programs.

3. Existing training programs could be expanded in the Fall of 1982 to accommodate a moderate increase in students or that new programs, if required, could be set-up by the Fall 1982.

Short and longer term strategies to reduce attrition, to increase applications by qualified applicants and to eventually effect an increase in training outputs would need to be developed and implemented in order to achieve this approach. Issues to be addressed prior to implementing this strategy would

EXHIBIT 4

EFFECT OF IMPLEMENTING STRATEGY A ON THE PROJECTED SUPPLY AND REQUIREMENT FOR F. T. E. NURSING ASSISTANTS



include:

- improving the image of nursing as a profession;
- developing and maintaining appropriate entrance requirements into nursing education programs;
- attracting both men and women into the profession;
- providing appropriate support/guidance to nursing students to ensure that students with demonstrated ability and skill remain in the programs until graduation;
- examining the factors affecting the relationship between education and the practice of nursing; and
- examining the educational experiences which affect the nurse's job expectations.

Exhibit 4, opposite, shows the effect of increasing training outputs by approximately one-third over the planned level of outputs from 1983 to 2000. The approximate impact of Strategy A on entry-level outputs would be as follows:

TABLE 3
PRESENT AND FUTURE ENTRY-LEVEL TRAINING OUTPUTS
IN THE WESTERN REGION

	Entry-level Enrollments (1981)	Outputs Anticipated (1981)	Strategy A Entry-level Outputs (1983)
British Columbia	498	382	500
Alberta	340	280	375
Saskatchewan	205	150	200
Manitoba	243	218	300
Western Region Total	1,286	1,030	1,375

Table 3 indicates that only small increases in enrollments would be needed to reach the entry-level outputs suggested by Strategy A, if attrition out of these training programs could be reduced. If attrition rates were unchanged, however, the number of enrollments would have to be significantly increased.

For example, the Province of British Columbia currently has 498 entry-level enrollments and anticipates training outputs of 382 nursing assistants. Strategy A suggests that these training outputs be increased to 500 in 1983. If attrition could be reduced from 24% to a level of approximately 10%, British Columbia could achieve an increase in training ouputs from 382 currently to 448 without increasing enrollments. If attrition rates were unchanged, the number of enrollments would have to be increased from 498 currently to approximately 617 to achieve Strategy A.

If the occupational shift is now -8%, Strategy A would be an adequate response for British Columbia and would result in a balanced manpower situation. In the case of Saskatchewan and Manitoba, Strategy A would result in only minor shortages. Alberta faces the largest shortage and Strategy A would be an inadequate response as there would still be large manpower shortages from 1981 to the year 2000. In Alberta, training outputs would need to be increased by approximately 40% - 50% (390 - 420 entry-level outputs per year), in order to meet the projected shortages indicated in this report.
If the occupational shift is now -10%, Strategy A would be inadequate for Alberta, Saskatchewan and Manitoba and would still result in manpower shortages of the following magnitude over the next five years.

	British Columbia	Alberta	Saskatchewan	Manitoba
1981	0	400	100	100
1982	0	800	200	200
1983	0	1100	200	400
1984	-100	1400	300	400
1985	-200	1700	300	400

Note: All figures have been rounded to the nearest hundred. A minus sign indicates a surplus.

In summary, it would appear that this traditional approach would be an inadequate response for the western region in future. It would help to reduce the projected shortage, but it would still not meet the requirement for nursing assistants in each province in the period 1981 -1985 as projected in this report. A strategy based on greatly increasing training outputs, without

addressing the problems of retention and recruitment facing this profession, would be an inefficient and ineffective strategy.

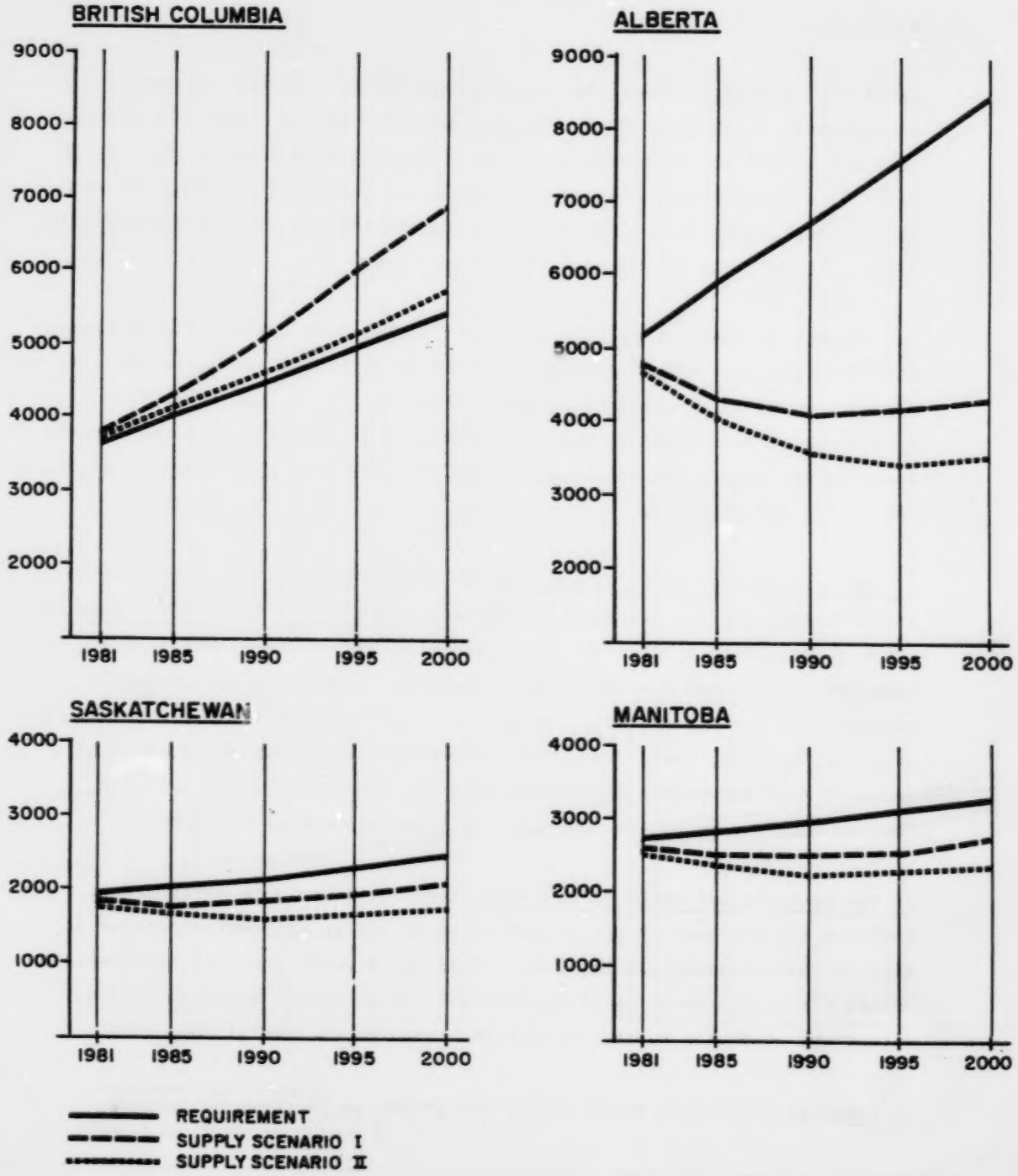
Strategy B - Retention and Recruitment

Recent efforts in manpower planning for the nursing occupations in other regions have been directed towards the development and implementation of retention and recruitment strategies. Most of these efforts have centered on addressing employment, and social and economic factors through such measures as increasing salaries, improving benefit packages, offering child day care centers, varying nurse scheduling approaches, etc. Some aggressive recruitment strategies have been designed to attract active nursing assistants from other provinces or other countries to a particular employment setting or geographic location. Other strategies have been designed to attract inactive nursing assistants back into the workforce. The effect of these types of retention and recruitment strategies on increasing the supply of active nursing assistants has not been studied sufficiently to ascertain their effectiveness or efficiency. Recent studies in the United States, however, suggest that short-term strategies concentrating on employment, and social and economic factors have not been particularly successful in the recruitment of registered nurses, and it is likely that this situation would also apply to nursing assistants.

It is now believed that manpower planning approaches for the nursing occupations (as discussed on page III-4) should focus on addressing the educational and organizational practice factors affecting retention and recruitment. These factors are the least recognized, most difficult and potentially the most fruitful factors to be addressed from a manpower planning standpoint. Both short-term and long-term targets would need to be developed. For example, a reasonable target for the western region could be that nursing assistants would have an average working life of 15 - 20 years and would stay in each employment setting for 3 years or longer. It is believed that it would be possible to reduce the net occupational shift factor from its present high level down to a more acceptable level, and that this could be accomplished over an extended period of time. The objective of this strategy

EXHIBIT 5

EFFECT OF IMPLEMENTING STRATEGY B ON THE PROJECTED SUPPLY AND REQUIREMENT FOR F. T. E. NURSING ASSISTANTS



would be to eventually stabilize this factor, and reduce the cyclical periods of surplus or shortages in active nursing assistants. However, it should be noted that there may be an irreducible minimum below which turnover and attrition cannot be reduced.

Exhibit 5, opposite, shows the impact of gradually reducing the net occupational shift from -8% to -5% over the next twenty years. This would have the effect of increasing the average working life from 12 years to 20 years over this period. Scenario II shows the effect of reducing the net occupational shift from -10% to -6% (or increasing the average working life from 10 years to 15 years) over the same period.

The assumption implicit in this approach is that both short and long term retention and recruitment strategies would be developed and implemented by the western region which would bring about this change. It may be possible to effect change more rapidly, but on balance, it is believed that the targets shown in Strategy B are reasonable given the extent of the occupational issues now facing the profession.

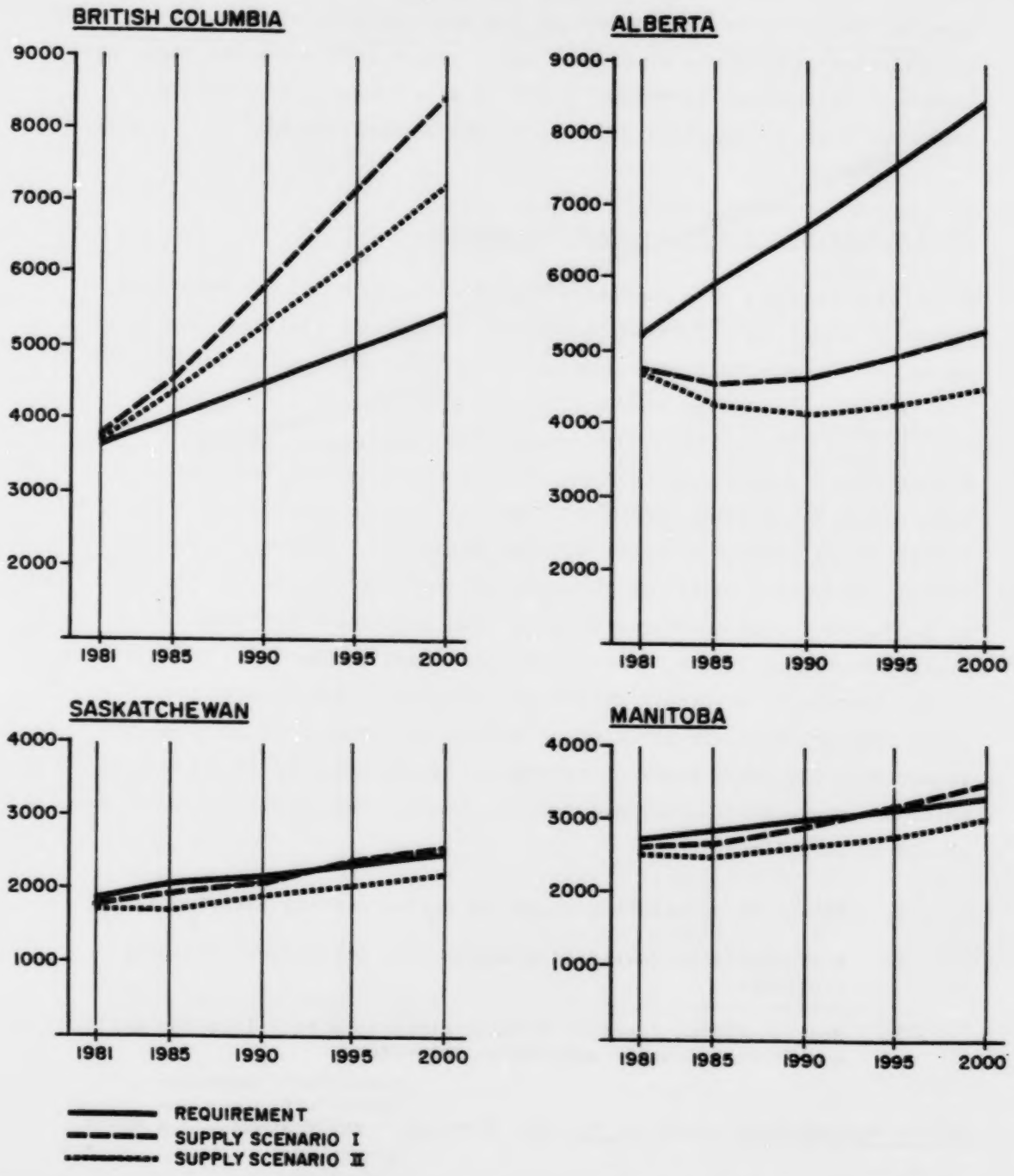
If the occupational shift is now -8%, as shown in Exhibit 5, this strategy would be adequate for British Columbia and could result in a 10% surplus of nursing assistants by the year 2000 (assuming that training outputs were held constant). Strategy B would be inadequate for Alberta, Saskatchewan or Manitoba and there would still be manpower shortages in these provinces. This strategy, however, would reduce these shortages to levels which would be somewhat more acceptable in Saskatchewan and Manitoba. It is unlikely, however that the projected shortages in Alberta would be tolerable.

If the occupational shift is now -10%, Strategy B would be an inadequate response for the western region and would result in manpower shortages in Alberta, Saskatchewan and Manitoba. Strategy B would possibly meet British Columbia's requirements as it would result in an almost balanced manpower situation, according to the projections shown in the exhibit opposite.

In summary, Strategy B would reduce the projected shortage of nursing

EXHIBIT 6

EFFECT OF IMPLEMENTING STRATEGY C ON THE PROJECTED SUPPLY AND REQUIREMENT FOR F. T. E. NURSING ASSISTANTS



assistants over the short and longer term. This strategy would be an adequate response for British Columbia whether the occupational shift is now at -8% or -10%. Strategy B on its own, however, would not meet the manpower needs of Alberta, Saskatchewan or Manitoba in the short term. The immediate shortage of full-time equivalents would grow until around 1990 and would then start to improve. On balance, Strategy B would be an inadequate response to the projected nursing assistant shortage in the western region.

Strategy C - Increase Training Outputs and
Develop Retention and Recruitment Strategies

Strategy C consists of a combination of Strategies A and B. Exhibit 6, opposite, shows the effect of increasing entry-level training outputs by approximately one-third and reducing the net occupational shift from -8% to -5% (Scenario I) or from -10% to -6% (Scenario II).

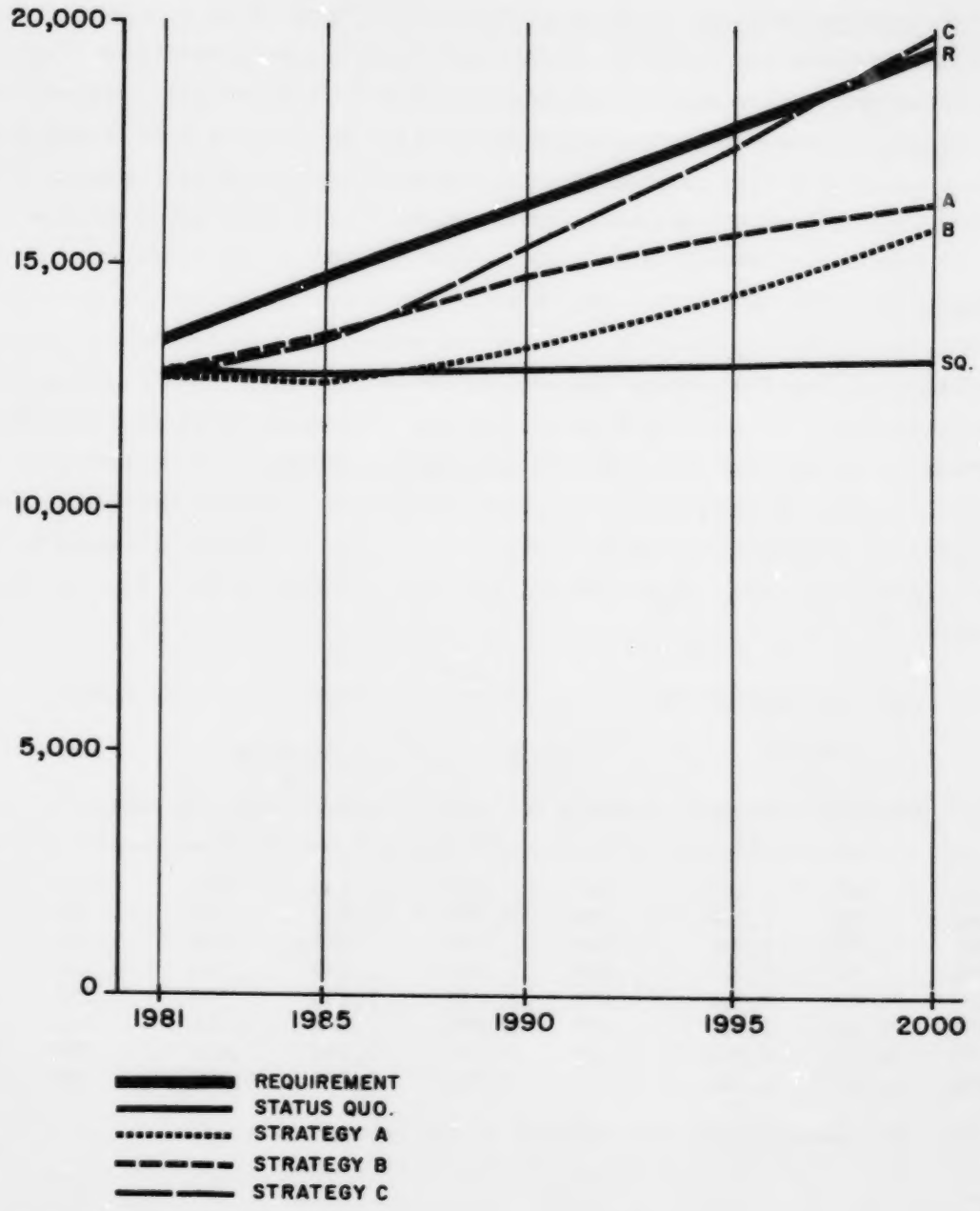
The rationale behind this approach is that the projected increase in requirement for nursing asssistants necessitates approaches which would more rapidly bring about a balanced manpower situation. Prolonged shortages of nursing assistants would not likely be tolerable in any of the provinces, and it is believed that shortages in particular employment settings contribute to greater shortages in the longer term. Shortages in the 1981-1985 timeframe could, therefore, adversely affect any attempts at recruitment into the profession or retention of existing supply, and could also increase the requirement for other types of nursing personnel (such as registered nurses), which are projected to face manpower shortages. The priorities in Strategy C should be as follows:

1. Retention of existing supply of active nursing assistants.
2. Recruitment of qualified students into entry-level training programs.
3. Recruitment of inactive nursing assistants back into the active workforce and their subsequent retention.

If the occupational shift is now -8%, Strategy C would result in a minor

EXHIBIT 7

EFFECT OF VARIOUS ALTERNATIVE STRATEGIES ON THE PROJECTED SUPPLY AND REQUIREMENT FOR F. T. E. NURSING ASSISTANTS IN THE WESTERN REGION



surplus of nursing assistants in British Columbia and an almost balanced situation in both Manitoba and Saskatchewan in the 1981-1985 timeframe. Strategy C would be inadequate for Alberta, and this province would need either to increase training outputs by a larger percentage or achieve a more rapid reduction in net occupational shift.

If the net occupational shift is now -10%, Strategy C would be adequate for British Columbia and could result in a balanced manpower situation. There would be minor shortages for Manitoba and Saskatchewan and this strategy could be considered adequate. Strategy C would again be inadequate for Alberta and there would be a need to significantly increase training and/or achieve a more rapid reduction in the net occupational shift.

Summary

In this section, the present and alternative future manpower planning strategies to address the projected shortage of nursing assistants in western Canada have been examined. Exhibit 7, opposite, shows the effect of each of the alternative strategies on the projected supply of full-time equivalent nursing assistants in the western region from 1981 to 2000. Alternative strategies would have the following effect on net requirements for the western region:

TABLE 4
NET REQUIREMENT FOR F.T.E. NURSING ASSISTANTS IN WESTERN CANADA

	Status Quo		Strategy A		Strategy B		Strategy C	
	Scenario I	Scenario II	Scenario I	Scenario II	Scenario I	Scenario II	Scenario I	Scenario II
1981	400	600	400	600	400	600	400	600
1982	700	1,200	700	1,200	500	1,200	800	1,200
1983	1,100	1,800	1,000	1,700	900	1,800	1,100	1,700
1984	1,400	2,300	1,000	1,900	1,200	2,300	1,100	1,800
1985	1,800	2,800	1,000	2,100	1,800	2,600	1,100	1,900
1990	3,300	5,000	1,400	3,200	2,800	4,300	800	2,300
1995	4,900	6,900	2,100	4,400	3,300	5,400	300	2,700
2000	6,500	8,700	3,100	5,800	3,500	6,200	300	2,700

Note: All numbers have been rounded to the nearest hundred.

The significant occupational issues presently affecting the supply of full-time equivalent nursing assistants require that future manpower strategies must focus on increasing the retention and recruitment of nursing assistants. A western region approach to this projected shortage should be developed so that future efforts can be closely monitored and evaluated on a co-ordinated basis. There is a pressing need for the development of a consistent and accurate data base on which to make informed manpower planning decisions. The current data base for nursing assistants is particularly weak and there are serious concerns about the accuracy of the information used to develop the supply and requirement projections used in this report.

It must be emphasized that the projections of supply contained in this report are highly sensitive to the net occupational shift factor assumptions which could not be validated. Similarily, we do not have a high level of confidence in the projection of requirement contained in this report, particularly because of recent trends in the decreased utilization of nursing assistants in relation to registered nurses. We would, therefore, caution the reader of this report to regard the net requirements contained in this report as the best possible estimates that could be made in light of the weakness of the existing data base.

IV - RECOMMENDATIONS

Recommendations with respect to manpower strategies to address the current and projected shortage of full-time equivalent nursing assistants in the western region are set out below. They are followed by recommendations for each of the four provinces. These recommendations focus on action to be taken during the 1981-1985 timeframe and reflect the significant concerns expressed in this report about the limitations of the data used and the assumptions made to develop the projections of both supply and requirement.

WESTERN REGION RECOMMENDATIONS

There are several approaches to health manpower strategies which would best be undertaken by the western region.

Development of a Manpower Planning Data Base

Previous approaches to manpower strategies for nursing assistants have been undertaken independently by each western province. Manpower planners and respective professional associations in each province collect and analyze data on nursing assistants in a different manner, making it difficult to accurately assess historical trends of factors affecting supply. Similarly, the lack of a consistent historical data base on the requirement for nursing assistants limits the ability of manpower planners to make informed decisions on the likely range of future requirements or to assess the effect of various manpower strategies implemented.

RECOMMENDATION #1.

The western region should develop an information base for nursing assistants to provide consistent, timely and accurate data for manpower planning purposes. Priority attention should be focussed on developing an information base to include:

- uniform definitions of active and inactive nursing assistants.

- a methodology for accurately measuring the occupational shift factor including the movement of nursing assistants from active to inactive status, movement in and out of the nursing profession, and attrition due to death or retirement.

- a methodology for monitoring and accurately assessing the migration of nursing assistants in and out of each province and for monitoring the immigration and emigration of nursing assistants.

- uniform definitions of part-time and casual workers and accurate measurements of the average number of hours worked by each of these groups.

- development of other information bases which would assist in validating trends in employment of nursing assistants and the range of requirement for nursing assistants in the future. This information should include the type and level of nursing assistants required to meet future employment demands, and trends in new employment settings for nursing assistants.

Alternative Manpower Strategies

Previous manpower strategies for nursing assistants have tended to focus on increasing the supply through increased training outputs. A number of significant occupational issues affecting both recruitment and retention of nursing assistants have been identified in this report. There is little validated research to indicate which types of recruitment and retention strategies are likely to be successful, nor which are likely to be the most successful over the short and longer term. There is, however, widespread belief that the development and implementation of effective recruitment and retention strategies could have a significant influence on reducing the projected shortage of nursing assistants in western Canada.

RECOMMENDATION #2.

The western region should conduct research to assess which types of short and longer term retention and recruitment strategies would likely be the most successful in increasing the supply of active nursing assistants. This research should include the identification of controllable and uncontrollable factors which impact on retention and recruitment.

Education and health manpower planners in all four provinces should be consulted, and input should be sought from the respective nursing assistant associations and from nursing employers.

Research into alternative manpower planning approaches for this occupation should focus on the educational and organizational practice factors affecting recruitment and retention.

Review of the Education of Nursing Assistants

The education process clearly has a considerable impact on the supply of nursing assistants. While the most recent experience indicates that the western region is not currently facing a problem in recruiting qualified applicants into programs for entry-level training as nursing assistants, there is a need to carefully monitor this situation in future. Attrition rates also suggest that these programs or the qualifications of the students accepted into them are not an appropriate match. Employers have found it difficult to retain graduates in the active workforce. The high rate of occupational shift out of the nursing profession suggests that there may be a conflict between the educational experience and expectations of a nursing assistant, and actual experiences in the job setting.

In addition to these entry-level training concerns which will have a serious impact on future manpower strategies, there is some concern about the availability and accessibility of continuing educational opportunities for active nursing assistants who are currently employed. This study has focussed on the more general requirement for nursing assistants. The projected supply and requirement for certain types and levels of nursing assistants requires study. The appropriate type, length, and setting for these educational programs should also be studied.

It has been suggested in this report that successful recruitment of inactive nursing assistants back into the active workforce may be somewhat linked to the availability and accessibility of good orientation and refresher training programs. This issue has not been studied sufficiently to determine whether this could significantly increase the future supply of nursing assistants.

There is a need to study the most appropriate means of accomplishing this type of education and assessing the likely efficiency and effectiveness of offering refresher level programs for nursing assistants.

RECOMMENDATION #3.

Research should be undertaken to examine the current educational programs for this occupation. This research should include:

- an examination of the entrance requirements to training programs, the accessibility of these programs to all qualified candidates, and the prospective student selection process;
- an examination of the factors affecting the relationship between education and the practice of nursing in both institutional and community settings, and the educational experiences which affect a nurse's job expectations;
- an examination of the support or guidance resources within an educational setting and the extent to which these resources contribute to reducing the attrition out of nursing programs; and
- an examination of how the educational process affects the image of the nursing profession generally.

Co-ordination of Health Manpower Strategies

One of the factors influencing the supply of nursing assistants in the four western provinces is migration between the provinces, as well as migration in or out to other provinces in Canada. The assessment of future supply in western Canada assumed that historical patterns of migration would continue over the next twenty years. Co-ordination of manpower strategies, including the development of recruitment and retention programs in the western region, could prove beneficial. It has been suggested in this report that the nursing labour pool is relatively mobile and there are projected shortages of nursing professionals in other parts of North America. It is likely that the western region may, in future, have to compete vigorously to retain its current and future supply of nursing assistants.

RECOMMENDATION #4.

The western region, through a new interprovincial committee, should coordinate health manpower strategies to recruit and retain nursing assistants. Consideration should be given to coordinating the following:

- compensation and benefit packages for both full-time and part-time nursing assistants, as well as any other financial incentives which may be considered to reduce shortages in particular geographic locations,
- sharing information and results of pilot retention and recruitment strategies undertaken in each province and the development of long-term research projects.

PROVINCIAL RECOMMENDATIONS

On the basis of the current statistical data concerning the supply and requirement for nursing assistants in the four western provinces, as well as consideration of the numerous factors which affect the supply and requirement, it would appear that there is a significant requirement for additional nursing assistants both in the short and long term future. Three alternative strategies for addressing these projected shortages were described and discussed in previous sections of this report. On the basis of this assessment, specific recommendations were developed for each province.

In developing these specific recommendations, the following key factors have been considered:

- the data base and key assumptions on which the current and future supply and requirement for nursing assistants is projected has many weaknesses, although it is the best information currently available;
- there are many occupational factors which impact on the supply and requirement for nursing assistants which cannot be accurately measured or projected in the future;
- it is doubtful that merely increasing the size or number of training programs will solve all of the problems associated with nursing requirements;
- there is a need to develop a plan which allows for the gradual increase in training programs on a phased basis over several years;
- the plan should permit each province to modify its training program enrollment on an annual basis to reflect updated supply and requirement projections;
- there are other factors such as labour market forces, hospital construction projects, governmental health policies, economic conditions, productivity changes, technological innovations, as well as geographic distribution problems, which impact on the supply and requirement for nursing assistants;
- the practicality of a province being able to adjust its training programs in the short term (1-2 years) must be considered.

On the basis of these key factors, as well as extensive discussions with the project Steering Committee, we have developed the following recommendations for nursing assistants for each province.

BRITISH COLUMBIA

According to the projections contained in this report, British Columbia will experience a balanced manpower situation of full-time equivalent nursing assistants over the period 1981-1985 if the net occupational shift is currently -10%, or it will have a minor surplus if the net occupational shift is -8%. It would appear that British Columbia is in a good position to direct its efforts towards the development and implementation of retention and recruitment strategies and to maintain its existing level of entry level training outputs from 1981-1985. Consequently, our recommendations are based on the rationale as contained in Strategy B of this report.

RECOMMENDATION #5.

The Province of British Columbia should improve its collection and analysis of data on both active and inactive nursing assistants so that informed decisions may be made in future years on the requirement for and the supply of nursing assistants in the Province.

RECOMMENDATION #6.

The Province of British Columbia should design and pilot test retention and recruitment strategies as a first priority and, based on the results of this research, develop and implement retention and recruitment strategies as soon as possible.

RECOMMENDATION #7.

The Province of British Columbia should make efforts to increase the number of entry-level training outputs, through reducing the current attrition rates of these programs.

RECOMMENDATION #8.

The Province of British Columbia should carefully monitor the success of retention or recruitment strategies and the supply and requirement for nursing assistants in order to be able to make any changes required in training program sizes in 1985 or sooner.

ALBERTA

Alberta is facing an immediate and longer-term shortage of nursing assistants according to the projections contained in this report. A dramatic growth in population and the planned construction of many new hospital beds over the next twenty years will result in a sharp increase in demand for nursing assistants as well as other nursing personnel. It may not be possible to secure large numbers of nursing assistants from other parts of Canada or from outside Canada because of projected shortages elsewhere. The projections contained in this report indicate that the successful development and implementation of retention and recruitment strategies alone, may not meet the projected requirements. Therefore, our recommendations address the need for increased training as well. Because of the concerns expressed earlier about the supply and requirement projections contained in this report, however, we have recommended that training outputs be increased to a level below that which is needed to meet the projected requirements. Our recommendations reflect the rationale contained in Strategy C.

RECOMMENDATION #9.

The Province of Alberta should improve its collection and analysis of data on both active and inactive nursing assistants so that informed decisions may be made in future years on the requirement for and supply of nursing assistants in the Province.

RECOMMENDATION #10.

The Province of Alberta should design and pilot test retention and recruitment strategies as a first priority and, based on the results of this research, develop and implement retention and recruitment strategies as soon as possible.

RECOMMENDATION #11.

The Province of Alberta should increase the number of entry-level training outputs by the maximum amount possible in 1982 and should attempt to

increase the size and/or number of its training programs to allow for an increase in trained graduates by approximately 20-30% above planned levels in the longer term.

RECOMMENDATION #12.

The Province of Alberta should carefully monitor the success of retention or recruitment strategies and the supply and requirement for nursing assistants in order to make any other changes in training program size in 1985 or sooner.

SASKATCHEWAN

According to the projections contained in this report, the Province of Saskatchewan is currently facing a shortage of full-time equivalent nursing assistants and this shortage is projected to grow over the next twenty years. Both short and longer-term strategies are required to address this projected shortage, particularly in light of the projected shortage of registered nurses in Saskatchewan indicated in a separate report. The projections contained in this report indicate that the successful development and implementation of retention and recruitment strategies alone, may not meet projected requirements. Therfore, our recommendations address the need for increased training as well. Although the projections contained in this report indicate that Saskatchewan would need to increase training by 30% above planned levels to meet projected requirements, the lack of a validated data base, as well as the significance of this increase in numbers and associated costs, has resulted in a recommendation of increased training outputs below that amount. Our recommendations are based on the rationale contained in Strategy C.

RECOMMENDATION #13.

The Province of Saskatchewan should improve its collection and analysis of data on both active and inactive nursing assistants so that informed decisions may be made in future years on both the requirement for and the supply of nursing assistants in the Province.

RECOMMENDATION #14.

The Province of Saskatchewan should design and pilot test retention and recruitment strategies as a first priority and, based on the results of this research, develop and implement retention and recruitment strategies as soon as possible.

RECOMMENDATION #15.

The Province of Saskatchewan should increase the number of entry level

training outputs by the maximum possible in 1982 and should attempt to increase the size and/or number of training programs to allow for an increase in trained graduates by approximately 15% to 20% above planned levels in the longer term.

RECOMMENDATION #16.

The Province of Saskatchewan should carefully monitor the success of retention or recruitment strategies and the supply and requirement for nursing assistants in order to make any other changes in training program size in 1985 or sooner.

MANITOBA

According to the projections contained in this report, the Province of Manitoba is currently facing only a minor shortage of full-time equivalent nursing assistants, but this shortage is projected to increase significantly over the next 20 years. Both short and long term strategies are required to address this projected shortage, particularly in light of the projected shortage of registered nurses indicated in a separate report. The projections contained in this report indicate that the successful development and implementation of retention and recruitment strategies alone, may not meet projected requirements. Therefore, our recommendations address the need for increased training as well. Although the projections indicate that Manitoba would need to increase training outputs by 30% to meet projected requirements, the lack of a validated data base, as well as the significance of this increase in numbers and associated costs, has resulted in a recommendation of increased training outputs below the level needed to meet projected requirements. These recomendations are based on the rationale contained in Strategy C.

RECOMMENDATION #17.

The Province of Manitoba should improve its collection and analysis of data on both active and inactive nursing assistants so that informed decisions may be made in future years on the requirement for and the supply of nursing assistants in the Province.

RECOMMENDATION #18.

The Province of Manitoba should design and pilot test retention and recruitment strategies as a first priority and, based on the results of this research, develop and implement retention and recruitment strategies as soon as possible.

RECOMMENDATION #19.

The Province of Manitoba should increase the number of entry level training outputs by the maximum possible in 1982 and should attempt to increase the size and/or number of training programs to allow for an increase in trained graduates by approximately 15% to 20% above planned levels in the longer term.

RECOMMENDATION #20.

The Province of Manitoba should carefully monitor the success of retention or recruitment strategies and the supply and requirement for nursing assistants in order to make any other changes required in training program size in 1985 or sooner.

APPENDIX A

STUDY APPROACH AND METHODOLOGY

STUDY APPROACH

Introduction

In order to achieve the study objectives, the work program consisted of three key activities. These were:

- the analysis of manpower supply and requirements, and the calculation of net manpower requirements;
- the analysis of existing training programs for Western Canada;
- the development of recommendations for alternative training locations and funding arrangements.

Analysis of Manpower Supply and Requirements

The analysis of manpower supply and requirements was designed to allow for a variety of data inputs, and for different emphasis on the occupation under review. A variety of data sources were used including provincial and national associations, health insurance agencies, and provincial health and education departments. In all instances, data was developed independently of previously published sources.

In addition to the basic projection of net manpower requirements, a number of sensitivity analyses have been completed to assess the impact of changes in the factors affecting supply and requirements, prior to developing recommendations for either additional training programs, or expanding existing training programs.

Approaches to Determining Manpower Requirements

The approach developed to determine manpower requirements used three methods of projection. These are discussed below.

1. Service Utilization Approach

The utilization approach is based on an analysis of the pattern of health service usage. It establishes trends in service utilization and projects these onto future population estimates. There are three steps in the service utilization approach.

Step 1 - Determine Per Capita Utilization Rate

Historical data of the number of services provided, by age and sex of recipient is derived. The number of services per age/sex group is then divided by the population for group in the corresponding year. This results in a per capita utilization rate.

Step 2 - Project Future Service Required

The per capita utilization rate is projected onto the low, medium and high population for each year from 1981 to 2000. This results in an estimate of total future services.

Step 3 - Estimated Number of Practitioners Required

Having determined the total future services, the model projects the number of practitioners required, by assuming a constant level of services per practitioner. The number of services per practitioner is determined by dividing total services by the number of practitioners in the base year. To estimate the number of practitioners, the model divides total future services required by the number of services per practitioner.

2. Service Target Ratio Approach

Service target ratios reflect a theoretical optimal manpower level required to meet health service requirements in the occupation under review. They are expressed as the ratio of practitioner to population. The service target ratios are derived based on discussion with health authorities, review of published reports, articles and summary of defined health care needs.

3. Population Ratio Approach

Population ratios are derived by dividing the total population at a specific point in time by the number of active practitioners. This results in a ratio of practitioners to population.

These ratios are analysed to determine if any trends exists. To project future manpower requirements, the model divides total projected population by the previously determined population ratio.

Summary of Approaches to Projecting Manpower Requirements

The three approaches outlined above have been used for the calculation of manpower requirements for this occupation. The specific application of each approach to this occupation is discussed under General Assumptions, Appendix B, following.

There were four general study reports issued separately to the Steering Committee which provided further information on the overall study methodology and approach. These reports are:

- Report A - Health Manpower Planning Approaches
- Report B - Health Manpower Planning Organization and Activities in Western Canada
- Report C - A Decision Process to Evaluate the Location of, and Funding Arrangements for Health Occupation Training Programs in Western Canada
- Report D - Population

APPENDIX B

PROVINCIAL NET MANPOWER REQUIREMENTS

EXHIBIT B-1

FULL-TIME EQUIVALENT NURSING ASSISTANTS IN WESTERN CANADA

YEAR	BRITISH COLUMBIA [1]	ALBERTA [2]	SASKATCHEWAN [3]	MANITOBA [4]
1976		3,786	1,823	2,197
1977		3,770	1,886	2,342
1978		4,072	1,899	2,450
1979		3,858	1,863	2,492
1980	3,589	4,884	1,819	2,615

Sources: 1. Licensed Practical Nurses Association of British Columbia (L.P.N.A.B.C.)

2. Alberta Association of Registered Assistants (A.A.R.N.).

3. Saskatchewan Nursing Assistants Association (S.N.A.A.)

4. Manitoba Association of Licensed Practical Nurses (M.A.L.P.N.)

GENERAL ASSUMPTIONS

Exhibit B-1, opposite, shows the recent historical trend of full-time equivalent nursing assistants in western Canada. These figures reflect the number of full-time equivalent nursing assistants who were active in nursing in their respective provinces, as identified by the sources noted at the bottom of the table. The basis used for calculating full-time equivalents for each province is shown later in this section.

Where possible, the historical data provided by associations was compared with the data provided by provincial government sources. Discrepancies were noted in some provinces and for consistency the respective nursing assistant associations data base was used as it provided greater detail on other factors required in the analysis.

The associations provided information on the estimated or actual breakdown between part-time and full-time practitioners for Exhibit 1. In 1980, approximately 60% of all nursing assistants worked full-time and 40% worked part-time. Each full-time nursing assistant represents 1.0 full-time equivalent. Each part-time nursing assistant in British Columbia, Alberta and Saskatchewan was assumed to represent 0.4 full-time equivalent. Each part-time nursing assistant in Manitoba was assumed to represent 0.5 full-time equivalent. As was the case with the full-time equivalency factor selected for registered nurses, there is no valid evidence to support this assumption.

The degree of accuracy of the information shown in Exhibit 1 is unknown. The data bases could not be validated and consequently it is difficult to have a high level of confidence in these numbers.

Supply Assumptions

The general assumptions made with respect to each of the factors which have the potential to affect manpower supply are shown in Exhibit B-2, overleaf.

EXHIBIT B-2

FACTORS AFFECTING MANPOWER SUPPLY
F.T.E. NURSING ASSISTANTS, WESTERN CANADA

FACTOR	BRITISH COLUMBIA	ALBERTA	SASKATCHEWAN	MANITOBA
Opening Stock	3,589	4,884	1,819	2,615
Net Migration	2.0%	-0.3%	-1%	-2.0%
Net Immigration	10	-0.3%	0	0
Net Occupational Shift	-8% -10%	-8% -10%	-8% -10%	-8% -10%
Training (Entry level F.T.E.)	380	280	150	220

- Opening stock - the number of full-time equivalent nursing assistants as calculated in Exhibit 1.

- Net migration - expressed as a percentage of opening stock. It was assumed that the historical trend would continue at a constant rate. There is no evidence to support this assumption and a review of historical trends did not reveal why there had been variations in the past. There is inadequate Association data on outflows of nursing assistants to other provinces and the percentages shown may be underestimating outflows as only those nursing assistants requesting verification of their status are recorded by the Association.

- Net immigration - expressed as a percentage of opening stock. It was assumed that the historical trend would continue at a constant rate. There is no evidence to support this assumption. Similar to the net migration factor, there is inadequate Association data on outflows and the percentages shown may be underestimating outflows.

- Net occupational shift - expressed as a percentage of opening stock. This factor includes movements from active to inactive, inactive to active, and attrition due to death or retirement. A range of -8% to -10% was assumed to be the status quo and it was also assumed that this range would be constant over the next twenty year period. There is no valid evidence to support this assumption and this may be understating or overstating supply. It should be emphasized that the use of -8% or -10% net occupational shift significantly affects the projections shown in this report, and our confidence in the projected net requirements is limited as we were unable to validate this extremely sensitive assumption.

- Training outputs (entry-level) - the number of planned entry-level outputs as projected by respective educational authorities in each province in 1981. It was assumed that these outputs would remain as indicated until the year 2000, which may be overestimating outputs

if enrollment figures do not meet quota levels. It was also assumed that attrition from these programs would remain at the same rate, which may be under or overestimating outputs. Each entry-level output was assumed to equal 1.0 full-time equivalent. There is no evidence to support the assumption that all entry-level outputs join the active workforce as full-time participants, but this is believed to be generally true of the majority.

SENSITIVITY ANALYSIS

The two most significant assumptions which could not be validated were the number of hours worked by each part-time nursing assistant and the net occupational shift factor. In order to test the sensitivity of these assumptions, several analyses were undertaken.

Hours Worked by Part-time Nursing Assistants

At present, data is collected annually by respective nursing associations in each province on the number of nursing assistants working full-time and part-time, and an attempt is made to collect information on the number of hours worked by each part-time nursing assistant. There is no standardized definition of part-time and this category could include those working several hours per year (on a casual basis), as well as those working on a half-time basis each week. Since the information is collected only once annually, it could also include those who were working part-time but are no longer in this category, or those who planned to work part-time but did not do so.

The number of hours worked by each part-time nursing assistant significantly affects the full-time equivalent calculation. Following discussions with respective nursing associations, and institutional employers, 0.4 (for British Columbia, Alberta and Saskatchewan) and 0.5 (for Manitoba) were selected as reasonable assumptions on which to base the calculation of full-time equivalents. This assumption was applied historically to arrive at the number of full-time equivalents in each province from 1975-1980, as shown in Exhibit B-1. It was also assumed that this full time equivalency factor would

remain unchanged from 1981 to the year 2000. There is no evidence to support this key assumption. It is possible, for example, that the breakdown between full-time and part-time nursing assistants will fluctuate in future and that the number of hours worked by part-time nursing assistants will increase or decrease in response to a variety of factors. Changes in the full-time equivalency factor would significantly affect the supply and requirement projections shown in this report.

The assumptions made are identical to those made for the registered nurses occupation as there was no information available to suggest that the nursing assistant occupation differs markedly from the registered nurses occupation in the full-time equivalency mix.

Net Occupational Shift Factor

The nursing professions are predominantly female and there has always been a significant amount of movement in and out of the active workforce, as well as movement from the nursing profession to another profession. The net occupational shift factor was developed to assess the extent of this movement and its impact on the present and future supply of nursing assistants in western Canada. The net occupational shift factor was defined to include:

- net movement from active to inactive or from inactive to active status,
- net movement into the profession from another profession or movement out of the active nursing profession to another profession, and
- attrition due to death or retirement.

A standard definition of both types of net movement was developed at the outset of the study. In the nursing professions, attrition due to death or retirement was included as part of the net occupational shift factor. This was done because we did not have accurate information for each province on the age breakdown of active practitioners and only partial information was available on the age breakdown of inactive practitioners. The age breakdowns, as supplied by each province, are set out later in this Appendix.

EXHIBIT B-3

EFFECT OF VARYING THE NET OCCUPATIONAL SHIFT FACTOR ON THE NET REQUIREMENT FOR F.T.E. NURSING ASSISTANTS IN WESTERN CANADA IN 1981

	NET OCCUPATIONAL SHIFT FACTOR				
PROVINCES	-12.5%	-10%	-8%	-6.5%	-5%
British Columbia	78	-22	-94	-147	-201
Alberta	517	420	322	249	175
Saskatchewan	117	81	45	17	10
Manitoba	186	134	82	42	3
Western Region Total	898	613	354	161	-13

NOTE: A minus sign indicates a surplus.

The net occupational shift factor was also used as an approximation of average working life. There are no working life expectancy tables for nursing assistants in Canada, and no similar tables available elsewhere. The sensitivity of the net occupational shift factor on the present and future supply of nursing assistants was examined under the following scenarios:

TABLE B-1

Net Occupational Shift Factor and
Average Working Life Approximations

Net Occupational Shift	Average Working Life Approximation
- 5.0%	20 years
- 6.5%	15 years
- 8.0%	12 years
-10.0%	10 years
-12.5%	8 years

Because of the large percentage of part-time participation in the workforce for this occupation, average working life was calculated in terms of full-time equivalents. For example, a nursing assistant who works full-time for 3 years has an average working life of 3 years. However if a nursing assistant works part-time for 3 years as a 0.4 full-time equivalent, average full-time equivalent working life would be 1.2 years.

There is no validated information available with respect to the net occupational shift of nursing assistants. There has been less research done on this occupation than for registered nurses. Because of the lack of information, the same net occupational shift assumptions were applied to nursing assistants as were used for the registered nurses.
Because of the number of occupational issues presently facing both professions, it is believed that the net occupational shift presently ranges from -8% to -10%. Following discussions with nursing associations and nursing employers, these two scenarios were selected for use in this report. Exhibit B-3, opposite, sets out the results of the analyses of the net requirement for

nursing assistants in western Canada in 1981 varying the net occupational shift factor. These analyses demonstrate the extreme sensitivity of the net occupational shift factor and the impact this has on the net requirement for nursing assistants in western Canada.

The selection of a single percentage value to reflect the net occupational shift factor over the 1981-2000 timeframe results in net requirements which may be exaggerated in any one year. The selection of two factors (-8% and -10%) for use in this report throughout the forecast period may result in net requirements which may not directly correspond with vacancy survey information collected at any one point in time in each of the four provinces. (For example, Saskatchewan reported only 18 vacancies in 1981.) The reasons for variance between vacancy information and the projections may be as follows:

- vacancy surveys measure the number of reported vacancies in budgeted positions at one point in time. The net requirements shown in this report reflect shortages in the available labour supply over the entire year. It is important to note that budgeted positions and available labour supply may be at variance, and that a vacancy survey at one point in time may not directly correspond to the labour situation over an entire year.

- the net occupational shift assumption has been subtracted out of a full-time equivalent stock which assumed a breakdown of 60% full-time and 40% part-time workers calculated to represent 0.4 FTE in British Columbia, Alberta and Saskatchewan and 0.5 FTE in Manitoba. If the full-time equivalent assumption is incorrect or if the vacancy pattern does not correspond to the full-time equivalancy mix, the resultant net requirements will not match.

- The vacancy survey reflects actual vacancies in budgeted positions only and this may be under estimating the actual number of vacancies if budgetary restrictions imposed on nursing employers have artificially reduced their requirements at any one given point in

time. In other words, the level of projected requirement shown in this report may not necessarily be identical to that currently being experienced.

The foregoing analysis indicates the extreme sensitivity of the projected net requirements to changes in the net occupational shift factor. Until more accurate information is available on this critical factor, better or more reliable projections of net requirements cannot be made.

Projected Supply Trends

The historical trend in supply differs somewhat from the projected forecast trend shown in this report. Only one year of historical information was available for British Columbia and under either Scenario in this report, the supply trend increases. In Alberta, a review of five years of historical information indicates that the number of total active nursing assistants had increased from 1976-1978, had decreased in 1979, and then increased in 1980. Under either scenario presented in this report, the number of active full-time equivalent nursing assistants decreased. In Saskatchewan, the supply curve has been almost flat over the last five years, and under either scenario in this report, the projected supply decreases slightly throughout the forecast period. In Manitoba, the supply of nursing assistants over the past five years has increased, and under both projected supply scenarios in this report, the supply decreases slightly. The reasons why the historical trends in supply may differ from the projected forecast trend may be attributable to a variety of complex factors which could not be measured in the past, nor accurately projected into the future. The model developed for this study used a number of critical factors known to effect the supply of nursing assistants (migration, immigration, training, and net occupational shift). The historical trend in the migration and immigration factors may have been misleading if the historical records, as recorded by associations, were not accurate. Training assumptions used in this report were based on the information provided, however several key assumptions were made about the participation of entry level graduates in the workforce which could not be compared with historical information. As indicated earlier, the net occupational shift assumption is undoubtedly the most critical assumption for

future supply projections and thus selection of two values (-8% and -10%) held constant over the entire projection period could have exaggerated the trend in supply. In addition to the factors used to develop the supply projections contained in this report, there are other factors which impact on the supply which could not be incorporated as part of the forecasting model as there is no information available to measure either the historical impact of these factors or their likely future impact. Some of these factors could include:

- availability of employment opportunities outside of the nursing profession;
- general economic conditions;
- social changes encouraging/discouraging movement into/out of nursing professions;
- availability/shortage of day care facilities for working mothers;
- divorce rates influencing a decision to return to the workforce or to increase labour participation rate;
- image of the profession influencing prospective students choosing a career path;
- salary and benefits for nursing positions relative to length of training required, working conditions, career mobility in comparison to other industry sectors.

According to Association spokesmen, nursing employers and research undertaken by others, the nursing professions are currently facing many major occupational issues. These issues have been commented on in this report and this may in part explain why the historical trend in supply may differ from the projected supply.

EXHIBIT B-4

SUMMARY OF MINIMUM INCREASE IN NUMBER OF BEDS REQUIRED

BRITISH COLUMBIA

YEAR	PATIENT DAYS	MINIMUM # OF BEDS	MINIMUM INCREASE
1981	3428813	9392	0
1982	3508380	9612	220
1983	3588480	9831	219
1984	3673653	10065	233
1985	3760962	10304	239
1990	4171074	11428	1124
1995	4627644	12678	1251
2000	5051640	13840	1162

ALBERTA

YEAR	PATIENT DAYS	MINIMUM # OF BEDS	MINIMUM INCREASE
1981	3153270	8639	0
1982	3274221	8970	331
1983	3399444	9314	343
1984	3517725	9638	324
1985	3626394	9935	298
1990	4140983	11345	1410
1995	4666892	12784	1439
2000	5245215	14370	1587

SASKATCHEWAN

YEAR	PATIENT DAYS	MINIMUM OF BEDS	MINIMUM INCREASE
1981	1639341	4491	0
1982	1669356	4574	82
1983	1699632	4657	83
1984	1729647	4739	82
1985	1759481	4820	82
1990	1901385	5209	389
1995	2037627	5583	373
2000	2184831	5986	403

MANITOBA

YEAR	PATIENT DAYS	MINIMUM # OF BEDS	MINIMUM INCREASE
1981	1524216	4176	0
1982	1541682	4224	48
1983	1560878	4276	53
1984	1580858	4329	53
1985	1600968	4386	57
1990	1699860	4657	271
1995	1771692	4854	197
2000	1848818	5043	189

Requirement Assumptions

The service utilization approach was used to project the number of full-time equivalent nursing assistants required in each province from 1981-2000. The number of active treatment patient days in each province in 1980 was obtained from government sources and this information was used to project the number of active treatment patient days from 1981-2000 using medium population projections. The ratio of full-time equivalent nursing assistants required to meet the projected patient days was held constant. The following ratios were used:

TABLE B-2

Ratio of Full-time Equivalent Nursing Assistants to Active Treatment Patient Days in Each Province

Province	Number of Full-time Equivalents per Active Treatment Patient Day
British Columbia	1:934
Alberta	1:623
Saskatchewan	1:886
Manitoba	1:574

Two analyses were undertaken using this approach. The most recent ratio, as shown above, was computed and an average ratio for the last five years. The difference in net requirement was marginal and the most recent ratio was selected as the most likely range of future requirement.

The projected requirement for full-time equivalent nursing assistants is based on projected patient days and assumes that active treatment hospital beds will be available to meet the projected number of patient days. Exhibit B-4, opposite, identifies the projected patient days based on medium population growth and the associated hospital beds. The number of beds were arrived at through the simple calculation of patient days divided by 365 which assumes 100% occupancy rate which is conservative. It must be recognized that the patient days and associated bed numbers must be available as if beds are not available to meet the patient days, the manpower requirements identified in our report may be overestimated. We recognize the strong trend towards

ambulant and home care of patients as an alternative to in-patient care which may impact on the number of nursing professionals required. However, it is not anticipated that the nursing manpower requirements for other than in-patient care would be as great. Therefore, if hospital beds are not provided to meet the projected patient days, and increased ambulatory and home care programs are provided as an alternative, the projected requirements indicated in this report may be overestimated.

We obtained from Alberta, estimates of the number of planned construction of active treatment beds to 1988. The analysis indicated that Alberta would need, at a minimum, approximately 2,150 more beds, and Alberta plans to construct approximately 2,800 beds by 1988. (Saskatchewan indicated that they expect beds per capita to decrease and the bed requirements shown in Exhibit B-4 are too high.) No information was available from other provinces on planned hospital construction. It is important for all provinces to recognize that the timing of hospital construction will impact on the requirement for nursing professionals and there will be a need to continually re-examine bed projections and the associated nursing assistant requirements.

The general assumptions implicit in this approach have been set out in the text of this report. Unfortunately, there is no information available to accurately assess whether this approach is reliable. Because of the serious concerns indicated earlier regarding the occupational issues facing this profession, attention should be focused on the 1981-1985 timeframe and research should be undertaken to develop a more accurate means of developing requirement projections.

PROVINCIAL ASSUMPTIONS

Assumptions were made with respect to the key supply factors used to develop supply projections. In this section, each of the numerical or percentage values used and the sources of this information for each province are set out.

Exhibits B-5 to B-8, following, summarize the historical full-time equivalent calculations, the assumptions made for each of the supply factors and sources of this information for each province.

SUMMARY OF NET REQUIREMENTS

Exhibits B-9 to B-16, following, set out the projected supply scenarios, the projected requirement and the net requirement for full-time equivalent nursing assistants in each province and in the western region.

- Exhibits B-9 and B-10 show the projected supply, requirement and net requirement based on a net occupational shift of -8% (Scenario I) and -10% (Scenario II). All other supply assumptions were held constant from 1981-2000.

- Exhibits B-11 and B-12 show the effect of implementing Strategy A - increasing entry-level training outputs by approximately one-third over planned levels.

- Exhibits B-13 and B-14 show the effect of implementing Strategy B - reducing the net occupational shift factor. Exhibit 13 shows the effect of gradually reducing the net occupational shift from -8% to -5% from 1981-2000. Exhibit 14 shows the effect of gradually reducing the net occupational shift from -10% to -6% from 1981-2000.

- Exhibits B-15 and B-16 show the effect of implementing Strategy C - increasing training outputs by approximately one-third over planned levels and reducing the net occupational shift factor. Exhibit 15 shows the combined effect of this strategy assuming a -8% net occupational shift in 1981. Exhibit 16 shows the combined effect of this strategy assuming a -10% net occupational shift in 1981.

This information is the output from the computer model developed for this study and was used for the analysis of the various alternative strategies discussed in this report. The graphic interpretation of this information, rounded to the nearest hundred, has been set out in the text of this report.

AGE BREAKDOWNS

The age breakdown of active practitioners registered with the respective nursing assistant associations in each province is set out in Exhibits B-17 through B-20, following. The information presented in these exhibits may not correspond to Exhibits B-5 through B-8, as they may reflect different time points or different interpretations of the term "active" nursing assistants.

EXHIBIT B-5

FULL-TIME EQUIVALENT NURSING ASSISTANTS

BRITISH COLUMBIA

YEAR	TOTAL ACTIVE	FULL-TIME NUMBER	FULL-TIME %	PART-TIME NUMBER	PART-TIME %	TOTAL FULL-TIME EQUIVALENT (USING 0.4)
1976						
1977						
1978						
1979						
1980	4,673	2,867	61.4	1,846	39.5	3,589

SOURCE: Licensed Practical Nurses Association of British Columbia.
Statistics for 1976 - 1979 inclusive were unavailable.

SUPPLY FACTORS	NUMERICAL OR PERCENTAGE VALUE	SOURCE
Opening Stock	3,589 f.t.e.	As calculated above.
Net Migration	+2% of opening stock	H.M.R.U. and Licensed Practical Nurses Association of B.C.
Net Immigration	10	H.M.R.U. and Licensed Practical Nurses Association of B.C.
Net Occupational Shift	-8% and -10%	PMP Assumption
Training Output (Entry Level)	380 f.t.e.	B.C. Department of Education

EXHIBIT B-6

FULL-TIME EQUIVALENT NURSING ASSISTANTS

ALBERTA

YEAR	TOTAL ACTIVE	FULL-TIME NUMBER	FULL-TIME %	PART-TIME NUMBER	PART-TIME %	TOTAL FULL-TIME EQUIVALENT (USING 0.4)
1976	4,982	2,989	60.0	1,993	40.0	3,786
1977	4,960	2,976	60.0	1,984	40.0	3,770
1978	5,359	3,215	60.0	2,144	40.0	4,072
1979	5,076	3,046	60.0	2,030	40.0	3,858
1980	6,426	3,856	60.0	2,570	40.0	4,884

SOURCE: Alberta Association of Registered Nursing Assistants and PMP Survey of Nursing Assistants Registration Board.

SUPPLY FACTORS	NUMERICAL OR PERCENTAGE VALUE	SOURCE
Opening Stock	4,884 f.t.e.	As calculated above.
Net Migration	-0.4% of opening stock	PMP Survey of Nursing Assistants Registration Board
Net Immigration	-0.3% of opening stock	PMP Survey of Nursing Assistants Registration Board
Net Occupational Shift	-8% and -10%	PMP Assumption
Training Output (Entry Level)	280 f.t.e.	Alberta Department of Advanced Education

EXHIBIT B-7

FULL-TIME EQUIVALENT NURSING ASSISTANTS

SASKATCHEWAN

YEAR	TOTAL ACTIVE	FULL-TIME NUMBER	FULL-TIME %	PART-TIME NUMBER	PART-TIME %	TOTAL FULL-TIME EQUIVALENT (USING 0.4)
1976	2,398	1,439	60.0	959	40.0	1,823
1977	2,481	1,489	60.0	992	40.0	1,886
1978	2,498	1,499	60.0	999	40.0	1,899
1979	2,452	1,471	60.0	981	40.0	1,863
1980	2,393	1,436	60.0	957	40.0	1,819

SOURCE: Saskatchewan Nursing Assistants Association.

SUPPLY FACTORS	NUMERICAL OR PERCENTAGE VALUE	SOURCE
Opening Stock	1,819 f.t.e.	As calculated above.
Net Migration	-1% of opening stock	Saskatchewan Nursing Assistants Association
Net Immigration	0	Saskatchewan Nursing Assistants Association
Net Occupational Shift	-8% and -10%	PMP Assumption
Training Output (Entry Level)	150 f.t.e.	Saskatchewan Department of Continuing Education

EXHIBIT B-8

FULL-TIME EQUIVALENT NURSING ASSISTANTS

MANITOBA

YEAR	TOTAL ACTIVE	FULL-TIME NUMBER	FULL-TIME %	PART-TIME NUMBER	PART-TIME %	TOTAL FULL-TIME EQUIVALENT (USING 0.4)
1976	2,857	1,757	61.5	1,100	38.5	2,197
1977	3,046	1,873	61.5	1,173	38.5	2,342
1978	3,186	1,959	61.5	1,227	38.5	2,450
1979	3,240	1,993	61.5	1,247	38.5	2,492
1980	3,440	2,091	61.5	1,309	38.5	2,615

SOURCE: Manitoba Association of Licensed Practical Nurses (M.A.L.P.N.)

SUPPLY FACTORS	NUMERICAL OR PERCENTAGE VALUE	SOURCE
Opening Stock	2,615 f.t.e.	As calculated above.
Net Migration	-2% of opening stock	Manitoba Association of Licensed Practical Nurses
Net Immigration	0	Manitoba Association of Licensed Practical Nurses
Net Occupational Shift	-8% and -10%	PMP Assumption
Training Output (Entry Level)	220 f.t.e.	Manitoba Department of Education

EXHIBIT B-9

NET F.T.E. REQUIREMENT FOR NURSING ASSISTANTS
SCENARIO I - STATUS QUO

	British Columbia		Alberta		Saskatchewan		Manitoba		Region	
	Stock	Req.	Stock	Req.	Stock	Req.	Stock	Req.	Stock	Req.
1981	3,764	3,670	4,739	5,061	1,805	1,850	2,574	2,655	12,882	13,236
Net		-94		322		45		81		354
1982	3,928	3,756	4,607	5,255	1,793	1,884	2,536	2,686	12,864	13,581
Net		-172		648		91		150		717
1983	4,082	3,842	4,486	5,456	1,781	1,918	2,503	2,719	12,852	13,935
Net		-240		970		137		216		1,083
1984	4,227	3,933	4,376	5,647	1,771	1,952	2,472	2,753	12,846	14,285
Net		-294		1,271		181		281		1,439
1985	4,364	4,027	4,275	5,821	1,762	1,986	2,445	2,789	12,846	14,623
Net		-337		1,546		224		344		1,777
1990	4,932	4,466	3,889	6,647	1,726	2,146	2,345	2,961	12,892	16,220
Net		-466		2,758		420		616		3,328
1995	5,349	4,955	3,644	7,490	1,704	2,300	2,285	3,087	12,982	17,832
Net		-394		3,846		596		802		4,850
2000	5,656	5,409	3,488	8,419	1,690	2,466	2,250	3,207	13,084	19,501
Net		-247		4,931		776		957		6,417

EXHIBIT B-10

NET F.T.E. REQUIREMENT FOR NURSING ASSISTANTS
SCENARIO II - STATUS QUO

	British Columbia		Alberta		Saskatchewan		Manitoba		Region	
	Stock	Req.	Stock	Req.	Stock	Req.	Stock	Req.	Stock	Req.
1981	3,692	3,670	4,641	5,061	1,769	1,850	2,521	2,655	12,623	13,236
Net		-22		420		81		134		613
1982	3,787	3,756	4,425	5,255	1,724	1,884	2,439	2,686	12,375	13,581
Net		-31		830		160		247		1,206
1983	3,874	3,842	4,326	5,456	1,685	1,918	2,366	2,719	12,251	13,935
Net		-32		1,130		233		353		1,684
1984	3,954	3,933	4,029	5,647	1,649	1,952	2,302	2,753	11,934	14,285
Net		-21		1,618		303		451		2,351
1985	4,027	4,027	3,904	5,821	1,618	1,986	2,246	2,789	11,795	14,623
Net		0		1,917		368		543		2,828
1990	4,316	4,466	3,348	6,647	1,506	2,146	2,051	2,961	11,221	16,220
Net		150		3,299		640		910		4,999
1995	4,507	4,955	3,032	7,490	1,443	2,300	1,948	3,087	10,930	17,832
Net		448		4,458		857		1,139		6,902
2000	4,632	5,409	2,853	8,419	1,408	2,466	1,894	3,207	10,787	19,501
Net		777		5,566		1,058		1,313		8,714

EXHIBIT B-11

NET F.T.E. REQUIREMENT FOR NURSING ASSISTANTS
SCENARIO I - STRATEGY A

	British Columbia		Alberta		Saskatchewan		Manitoba		Region	
	Stock	Req.	Stock	Req.	Stock	Req.	Stock	Req.	Stock	Req.
1981	3,764	3,670	4,739	5,061	1,805	1,850	2,574	2,655	12,882	13,236
Net		-94		322		45		81		354
1982	3,928	3,756	4,607	5,255	1,793	1,884	2,536	2,686	12,864	13,581
Net		-172		648		91		150		717
1983	4,082	3,842	4,481	5,456	1,781	1,918	2,503	2,719	12,852	13,935
Net		-240		970		137		216		1,083
1984	4,347	3,933	4,557	5,647	1,821	1,952	2,552	2,753	13,277	14,285
Net		-414		1,090		131		210		1,008
1985	4,596	4,027	4,536	5,821	1,857	1,986	2,597	2,789	13,586	14,623
Net		-569		1,285		129		192		1,037
1990	5,635	4,466	4,453	6,647	1,994	2,146	2,762	2,961	14,844	16,220
Net		-1,169		2,194		152		199		1,376
1995	6,397	4,955	4,401	7,490	2,080	2,300	2,860	3,087	15,738	17,832
Net		-1,442		3,089		220		227		2,094
2000	6,957	5,409	4,368	8,419	2,134	2,466	2,917	3,207	16,376	19,501
Net		-1,548		4,051		332		290		3,125

EXHIBIT B-12

NET F.T.E. REQUIREMENT FOR NURSING ASSISTANTS
SCENARIO II - STRATEGY A

	British Columbia		Alberta		Saskatchewan		Manitoba		Region	
	Stock	Req.	Stock	Req.	Stock	Req.	Stock	Req.	Stock	Req.
1981	3,692	3,670	4,641	5,061	1,769	1,850	2,521	2,655	12,623	13,236
Net		-22		420		81		134		613
1982	3,787	3,756	4,425	5,255	1,724	1,884	2,439	2,686	12,375	13,581
Net		-31		830		160		247		1,206
1983	3,874	3,842	4,326	5,456	1,685	1,918	2,366	2,719	12,251	13,935
Net		-32		1,130		233		353		1,684
1984	4,074	3,933	4,238	5,647	1,699	1,952	2,382	2,753	12,393	14,285
Net		-141		1,409		253		371		1,892
1985	4,258	4,027	4,160	5,821	1,712	1,986	2,396	2,789	12,526	14,623
Net		-231		1,661		274		393		2,097
1990	4,980	4,466	3,877	6,647	1,759	2,146	2,445	2,961	13,061	16,220
Net		-514		2,770		387		516		3,159
1995	5,455	4,955	3,716	7,490	1,785	2,300	2,471	3,087	13,427	17,832
Net		-500		3,774		515		616		4,405
2000	5,769	5,409	3,625	8,419	1,800	2,466	2,485	3,207	13,679	19,501
Net		-360		4,794		666		722		5,822

EXHIBIT B-13

NET F.T.E. REQUIREMENT FOR NURSING ASSISTANTS
SCENARIO I - STRATEGY B

	British Columbia		Alberta		Saskatchewan		Manitoba		Region	
	Stock	Req.	Stock	Req.	Stock	Req.	Stock	Req.	Stock	Req.
1981	3,752	3,670	4,723	5,061	1,799	1,850	2,565	2,655	12,839	13,236
Net		-82		338		51		90		397
1982	3,904	3,756	4,576	5,255	1,781	1,884	2,520	2,686	12,781	13,581
Net		-148		679		103		166		800
1983	4,047	3,842	4,443	5,456	1,765	1,918	2,479	2,719	12,734	13,935
Net		-205		1,013		153		240		1,201
1984	4,206	3,933	4,350	5,647	1,762	1,952	2,459	2,753	12,777	14,285
Net		-273		1,297		190		294		1,508
1985	4,357	4,027	4,265	5,821	1,758	1,986	2,441	2,789	12,821	14,623
Net		-330		1,556		228		348		1,802
1990	5,132	4,466	4,052	6,647	1,797	2,146	2,441	2,961	13,422	16,220
Net		-666		2,595		349		520		2,798
1995	6,000	4,955	4,100	7,490	1,907	2,300	2,553	3,087	14,560	17,832
Net		-1,045		3,390		393		534		3,272
2000	6,929	5,409	4,270	8,419	2,048	2,466	2,711	3,207	15,958	19,501
Net		-1,520		4,149		418		496		3,543

EXHIBIT B-14

NET F.T.E. REQUIREMENT FOR NURSING ASSISTANTS
SCENARIO II - STRATEGY B

	British Columbia		Alberta		Saskatchewan		Manitoba		Region	
	Stock	Req.	Stock	Req.	Stock	Req.	Stock	Req.	Stock	Req.
1981	3,692	3,670	4,641	5,061	1,769	1,850	2,521	2,655	12,623	13,236
Net		-22		420		81		134		613
1982	3,787	3,756	4,425	5,255	1,724	1,884	2,439	2,686	12,375	13,581
Net		-31		830		160		247		1,206
1983	3,874	3,842	4,231	5,456	1,685	1,918	2,366	2,719	12,156	13,935
Net		-32		1,225		233		353		1,779
1984	3,989	3,933	4,097	5,647	1,665	1,952	2,324	2,753	12,075	14,285
Net		-56		1,550		287		429		2,210
1985	4,096	4,027	3,976	5,821	1,647	1,986	2,286	2,789	12,005	14,623
Net		-69		1,845		339		503		2,618
1990	4,593	4,466	3,579	6,647	1,604	2,146	2,183	2,961	11,959	16,220
Net		-127		3,068		542		778		4,261
1995	5,118	4,955	3,459	7,490	1,633	2,300	2,198	3,087	12,408	17,832
Net		-163		4,031		667		889		5,424
2000	5,741	5,409	3,529	8,419	1,721	2,466	2,298	3,207	13,289	19,501
Net		-332		4,890		745		909		6,212

EXHIBIT B-15

NET F.T.E. REQUIREMENT FOR NURSING ASSISTANTS
SCENARIO I - STRATEGY C

	British Columbia		Alberta		Saskatchewan		Manitoba		Region	
	Stock	Req.	Stock	Req.	Stock	Req.	Stock	Req.	Stock	Req.
1981	3,752	3,670	4,723	5,061	1,799	1,850	2,565	2,655	12,839	13,236
Net		-82		338		51		90		397
1982	3,904	3,756	4,576	5,255	1,781	1,884	2,250	2,686	12,781	13,581
Net		-148		679		103		166		800
1983	4,047	3,842	4,538	5,456	1,765	1,918	2,479	2,719	12,829	13,935
Net		-205		918		153		240		1,106
1984	4,326	3,933	4,532	5,647	1,812	1,952	2,539	2,753	13,209	14,285
Net		-393		1,115		140		214		1,076
1985	4,590	4,027	4,527	5,821	1,854	1,986	2,593	2,789	13,564	14,623
Net		-563		1,294		132		196		1,059
1990	5,856	4,466	4,636	6,647	2,074	2,146	2,871	2,961	15,437	16,220
Net		-1,390		2,011		72		90		783
1995	7,148	4,955	4,931	7,490	2,319	2,300	3,180	3,087	17,578	17,832
Net		-2,193		2,559		-19		-93		254
2000	8,468	5,409	5,306	8,419	2,568	2,466	3,489	3,207	19,831	19,501
Net		-3,059		3,113		-102		-282		330

EXHIBIT B-16

NET F.T.E. REQUIREMENT FOR NURSING ASSISTANTS
SCENARIO II - STRATEGY C

	British Columbia		Alberta		Saskatchewan		Manitoba		Region	
	Stock	Req.	Stock	Req.	Stock	Req.	Stock	Req.	Stock	Req.
1981	3,692	3,670	4,641	5,061	1,769	1,850	2,521	2,655	12,623	13,236
Net		-22		420		81		134		613
1982	3,787	3,567	4,425	5,255	1,724	1,884	2,439	2,686	12,375	13,581
Net		-31		830		160		247		1,206
1983	3,874	3,842	4,326	5,456	1,685	1,918	2,366	2,719	12,251	13,935
Net		-32		1,130		233		353		1,684
1984	4,109	3,933	4,278	5,647	1,715	1,952	2,404	2,753	12,506	14,285
Net		-176		1,369		237		349		1,779
1985	4,328	4,027	4,234	5,821	1,742	1,986	2,437	2,789	12,741	14,623
Net		-301		1,587		244		352		1,882
1990	5,282	4,466	4,131	6,647	1,867	2,146	2,592	2,961	13,872	16,220
Net		-816		2,516		279		369		2,348
1995	6,160	4,955	4,212	7,490	2,008	2,300	2,770	3,087	15,150	17,832
Net		-1,205		3,278		292		317		2,682
2000	7,210	5,409	4,443	8,419	2,182	2,466	2,991	3,207	16,826	19,501
Net		-1,801		3,976		284		216		2,675

EXHIBIT B-17

TOTAL NUMBER OF ACTIVE NURSING ASSISTANTS IN BRITISH COLUMBIA BY AGE

Age Group	Male	Female	Total
20 - 29	49	2,057	2,102
30 - 39	79	2,277	2,356
40 - 49	32	992	1,024
50 - 59	25	691	716
60 and over	4	248	252
Unknown	5	172	177
TOTAL	190	6,437	6,627

Source: Health Manpower Research Unit, University of British Columbia. Prepared as at July 15, 1981. Active stock tabulated only since records are incomplete for those who did not renew their license.

EXHIBIT B-18

TOTAL NUMBER OF ACTIVE NURSING ASSISTANTS IN ALBERTA BY AGE

Age Group	Male	Female	Total
21 - 25	-	-	614
26 - 30	-	-	1,057
31 - 35	-	-	1,100
36 - 40	-	-	886
41 - 45	-	-	485
46 - 50	-	-	382
51 - 55	-	-	273
56 - 60	-	-	162
61 - 65	-	-	80
66 and over	-	-	22
Not stated	-	-	1,619
TOTAL	-	-	6,680

Source: The Registrar Health Occupations, Alberta Social Services and Community Health.

EXHIBIT B-19

TOTAL NUMBER OF ACTIVE NURSING ASSISTANTS IN SASKATCHEWAN BY AGE

Age Group	Male	Female	Total
Under 20	-	-	20
20 - 24	-	-	496
25 - 29	-	-	495
30 - 34	-	-	353
35 - 39	-	-	271
40 - 44	-	-	134
45 - 49	-	-	133
50 - 54	-	-	185
55 - 59	-	-	70
60 - 64	-	-	13
TOTAL	-	-	2,170

Source: Saskatchewan Registered Nurses Association.
Information current as of December 31, 1979.

EXHIBIT B-20

TOTAL NUMBER OF ACTIVE NURSING ASSISTANTS IN MANITOBA BY AGE

Age Group	Male	Female	Total
20 - 24	-	-	419
25 - 34	-	-	1,498
35 - 44	-	-	794
45 - 54	-	-	461
55 - 64	-	-	260
65 and over	-	-	45
Not stated	-	-	85
TOTAL	36	3,526	3,562

Source: Manitoba Association of Licensed Practical Nurses. Based on computer print-out prepared September 1981. Figures shown include Member Type 1 - Active Practising - members only.

APPENDIX C

BIBLIOGRAPHY

REPORTS

Alberta Hospital Association, Nursing Manpower - A Study of Nursing Supply and Demand in Alberta Hospitals and Nursing Homes, 1980.

Alberta Association of Registered Nurses, Nursing Manpower Needs in Alberta - Current and Future, 1980.

Canadian Association of Practical and Nursing Assistants, Presentation to the Minister, Department of National Health and Welfare, July 1979.

Canadian Nurses Association, Putting "Health" into Health Care, 1980.

Filoromo, T. and Ziff, D., Nurse Recruitment: Strategies for Success, Rockville: Aspen Systems Corporation, 1980, p. 137 - 149.

Foothills Hospital School of Nursing, Survey '79 - A Follow-up of Foothills Hospital School of Nursing Graduates and their Career Patterns 1968 through 1978, 1980.

Government of Saskatchewan, Analysis of Psychiatric Nurses' Staffing Patterns, September 1980.

Manitoba Association of Registered Nurses, Nursing Education: Challenge and Change, 1975.

Psychiatric Nurses' Association of Alberta, A Position Paper Regarding Psychiatric Nursing in the Mental Health Care Delivery System in Alberta, August 1978.

Province of Alberta, Report of the Joint Ministerial Task Force on Nursing Education in Manitoba, 1977.

Registered Nurses Association of Ontario, Report of Task Force on Nursing Shortage, 1981.

Saskatchewan Psychiatric Nurses' Association, Executive Director's Report - Annual Meeting 1980-81.

Saskatchewan Psychiatric Nurses' Association, Degree Program Interest Survey, 1980, (draft report).

Saskatchewan Registered Nurses' Association, Survey of Inactive Nurses, 1980.

St. Boniface General Hospital, Report of the Task Force on Nursing Manpower in the 1980's, October 1981.

University of British Columbia, Health Services Research and Development, Registered Psychiatric Nurses in British Columbia, 1977 - A Descriptive Report, 1980.

University of British Colmbia, Health Services Research and Development, A Survey of Difficult-to-Fill Positions for Registered Nurses and Other Health Care Disciplines in British Columbia, 1980 - First Year-end Report.

University of British Columbia, Health Services Research and Development, ROLLCALL 79, A Status Report of Health Personnel in the Province of British Columbia, March 1980.

University of British Columbia, Health Services Research and Development, ROLLCALL UPDATE 80, A Status Report of Selected Health Personnel in the Province of British Columbia, December 1980.

University of Texas (Austin), Centre for Research, School of Nursing, Conditions Associated with Registered Nurses Employment in Texas, 1980.

U.S. Department of Commerce, Public Health Centre Service, Bethesda, Md. Division of Nursing, Review and Evaluation of Nursing Productivity, Volume III, Literature and Research Review, 1975.

U.S. Department of Health, Education and Welfare, Public Health Service, Health Resources Administration, Nursing Staffing Requirements and Related Topic: A Selected Bibliography, 1979.

National Commission on Nursing (U.S.), Abstracts of State Study and Policy Documents, 1981.

Flaherty, Dr. M. Josephine, Health and Welfare Canada, Employment for Registered Nurses in Canada, 1980.

JOURNAL ARTICLES

Alberta Association of Registered Nurses, "Drastic Nursing Shortage Predicted Unless....", AARN Newsletter, April 1980.

Alberta Association of Registered Nurses, "Supply of Nurses - Can we meet the demand?", AARN Newsletter, November 1980.

Alberta Association of Registered Nurses, "AHA Nursing Manpower Study of Factors in Nursing Supply and Demand", November 1980", AARN Newsletter, March 1981.

Alberta Hospital Association, Management Analysis and Planning Services, "A Proposal for an Analysis of Nursing Manpower Resources and Requirements in Alberta, unpublished, March 1980.

American Nurses Association, "Survey Shows a Million RNs Employed", The American Nurse, October 1980.

Araiyo, M., "Creative Nursing Administration Sets the Climate for Retention", Hospitals, May 1, 1980.

Arnold, Nancy, "Where have all the nurses gone?", British Medical Journal, January 1980.

Association of Operating Room Nurses, "RN Supply Predicted to be Adequate by 1985", AORN Journal, August 1979.

Association of Western Hospitals, "The Nursing Shortage: Current Trends in Recruitment and Retention", AWA Convention Report, September 1980.

Aycock, Edward J. "Nursing - Productivity Gains Under your Control", Hospital Topics, May/June 1978.

Bergman, Rebecca, "Nursing Manpower: Issues and Trends", Journal of Nursing Administration, May 1975.

Brief, Arthur, "Turnover Among Hospital Nurses: A Suggested Model", Journal of Nursing Administration, October, 1979.

Brown, Beverley I. "Realistic Workloads for Community Health Nurses", Nursing Outlook, April 1980.

Del Bueno, D. et al., "Two Ways to Retain Staff", American Journal of Nursing, April 1, 1978.

Driscoll, Veronica M. "Remedies for a Troubled Health Care System", N.Y. State News Association Journal, December 1980.

Fralic, Maryann F., "Nursing Shortage: Coping Today and Tomorrow", Hospitals, May 1980.

Hospitals, "Nursing Shortage Linked to Hospital Environment", January 1980.

Howie, Heather, "What do they have that we don't"?, Health Care, April 1981.

Johnson, Walter L., "Supply and Demand for Registered Nurses - Some observations on the current picture and prospects to 1985" (Part 1 and 2), "Nursing Health Care", August 1980.

Kaiser, P., "Ten Steps to Interviewing Job Applicants", American Journal of Nursing, April, 1978.

International Nursing Review, "Nursing Shortage is Acute in U.S.", March-April 1980.

Journal of Advanced Nursing, "Male/Female Dichotomy in the Nursing Profession in a Time of Social Change", January 1978.

Journal of Gerontological Nursing, Editorial, October 1980.

Kallisch, Phillip A., "The Nursing Shortage, the President and the Congress", Nursing Forum, 1980.

Kuhn, Barbara G., "Prediction of Nursing Requirements from Patient Characteristics - II", International Journal of Nursing Studies, 1980.

Link, Charles R. and Settle, Russell F., "Financial Incentive and Labour Supply of Married Professional Nurses: An Economic Analysis", Nursing Research, July/August 1980.

Link, Charles R. and Settle, Russel F., "Wage Incentive and Married Professional Nurses: A Case of Backward - bending Supply?", Economic Inquiry, February 1969.

Levine, Eugene, "Nursing Manpower - Yesterday, Today, and Tomorrow", American Journal of Nursing, February 1969.

New Zealand Nursing Journal, Editorial "Nursing Manpower Planning - A Matter of Urgency", July 1980.

Allen, Michael, "Finding Nurses for the Future - The Recruitment and Selection of Nurse Learners", Nursing Times, January 1981.

Windsor, Ralph and Collinson, Patricia, "Looking for Tomorrow's Nurses", Nursing Times, October 1980.

Royal, G.C. "Filling the Nursing Schools - A Question of Cost and Calibre", Nursing Times, November 1980.

Seybolt, J.W., and Walker, D.D., "Attitude Survey Proves to be a Powerful Tool for Reversing Turnover", Hospitals, May 1, 1980.

Sheridan, J.E. et al., "Predicting Leadership Behavior in a Hospital Organization", Academy of Management Journal, December, 1978.

Mercer, Geoffrey, "Nurse Employment and Mobility of Trained Staff", Nursing Times, November 1980.

Logan, Winifred, "The migration of nursing personnel", International Nursing Review, July/August 1980.

Marron-Cost, Joan, "Productivity: Key to Cost Containment", Hospitals, September 1980.

McCullough, D.M., "Nursing Manpower Planning", World of Irish Nursing, January 1977.

Quinn, Sheila, "Zero Growth", Nursing Mirror, October 1980.

Watson, L.A., "Keeping Qualified Nurses", Supervisor Nurse, October, 1979.

White, Charles, "Nursing Shortage, Turnover and Some Proposed Solutions", Hospital Forum, June 1977.

White, Charles, "Where Have All the Nurses Gone - and Why?", Hospitals, May, 1980.

White, Charles, "Redefining Professional Nursing: Solution to the Chronic Shortage", Hospital Progress, October 1981.

Number/
Numéro

6

Province of
British Columbia

Province of
Alberta

Province of
Saskatchewan

Province of
Manitoba

WESTERN CANADA
HEALTH MANPOWER TRAINING STUDY

SECTION III - CATEGORY 5 REPORTS

PHYSICIANS

Report A - THE SCOPE OF EXISTING TRAINING PROGRAMS - CATEGORY 5 OCCU

Report XXIII - PHYSICIANS

Province of
British Columbia

Province of
Alberta

Province of
Saskatchewan

Province of
Manitoba

WESTERN CANADA
HEALTH MANPOWER TRAINING STUDY

Category # 5 - Report A

THE SCOPE OF EXISTING TRAINING PROGRAMS
Category # 5 OCCUPATIONS

Report A - THE SCOPE OF EXISTING TRAINING PROGRAMS - CATEGORY 5 OCC
Report XXIII - PHYSICIANS

PHYSICIANS
THE SCOPE OF EXISTING TRAINING PROGRAMS

PEAT, MARWICK and PARTNERS

February, 1982

THE SCOPE OF EXISTING TRAINING PROGRAMS
PHYSICIANS

INTRODUCTION

In this report, we review the scope of existing training programs in Western Canada for physicians. This review identifies undergraduate, specialty and sub-specialty medical education programs.

EXHIBIT 1

GRADUATE TRAINING PROGRAMS FOR PHYSICIANS IN WESTERN CANADA
PROJECTED NUMBER OF AVERAGE ENROLMENTS AND GRADUATES

Province and Institution	Projected Number of Average Enrolments and Graduates										Source
	Enrolments					Graduates					
	1981	1982	1983	1984	1985	1981	1982	1983	1984	1985	
British Columbia University of British Columbia	120	120	120	120	120	81	81	88	110	110	1
Alberta	118	118	118	118	118	110	110	110	110	110	2
University of Alberta	72	72	72	72	72	68	68	68	68	68	3
University of Calgary											
Saskatchewan University of Saskatchewan	64	64	64	64	64	61	53	60	59	61	4
Manitoba University of Manitoba	95	95	95	95	95	90	90	90	90	90	5
Total Projected for Western Canada	469	469	469	469	469	410	402	416	437	439	

Source:
1. University of British Columbia
2. University of Alberta
3. University of Calgary
4. University of Saskatchewan
5. University of Manitoba

TRAINING PROGRAMS FOR PHYSICIANS

1.0 WESTERN CANADA

There are five educational programs for Physicians in Western Canada which provide graduate training and a range of post-graduate specialty programs. In the following discussion the term "graduate" training should be interpreted as the basic medical education program.

1.1 BRITISH COLUMBIA

The University of British Columbia offers a 4 year graduate medical program which must be followed by a minimum of 1 year in an internship or residency program to qualify for licencing to practice medicine. Graduates of medical programs may proceed directly into specialty training programs which vary in length from 4 to 5 years.

The University of British Columbia has approximately 100 students completing graduate medical education annually. Post-graduate students entering specialty training number approximately 90 students annually; 13 of these would be in Family Practice. The enrolment in the graduate medical education program has been increased. As a result, approximately 115 students will graduate annually as of 1984.

1.2 ALBERTA

Both the University of Alberta and the University of Calgary offer medical education programs. The program at the University of Alberta is of 4 years duration. The University of Calgary program does not provide extended summer vacations and, as a result, has reduced the length of its program to 3 years.

Medical graduates wishing to practice in General or Family Practice in the province of Alberta must complete 2 years of approved residency or internship training.

A range of post-graduate residency programs are available at each of the Alberta medical training centres.

The approximate number of graduates and post-graduates respectively for the University of Alberta are 110 and 75 and for the University of Calgary 70 and 74. The figures for post-graduate education include 20 Family Practice graduates at the University of Alberta and 38 at the University of Calgary.

1.3 SASKATCHEWAN

The University of Saskatchewan offers a 5 year undergraduate medical training program. This program includes the 1 year internship which is the minimum requirement for the practice of medicine in Saskatchewan.

The University of Saskatchewan also offers a range of graduate medical programs leading to certification in a number of specialties.

Approximately 60 students complete graduate training and 50 complete post-graduate programs annually. (includes 20 Family Practice graduates)

1.4 MANITOBA

The University of Manitoba offers a 4 year graduate medical education program. This program must be followed by a minimum of one year spent in a mixed, rotating or straight internship to meet the licencing requirements of the College of Physicians and Surgeons of Manitoba.

The Division of Post-graduate Medical Education of the University of Manitoba offers a range of specialty training programs.

Approximately 90 students complete graduate training and 84 complete post-graduate programs annually. (includes 14 Family Practice graduates)

DISCUSSION OF POSTGRADUATE MEDICAL EDUCATION PROGRAMS

The following 3 tables present information summarizing the post-graduate medical education programs which are available. There are a number of factors regarding post-graduate medical education programs which should be considered which will assist in interpreting the data:

- examination for certification in medical specialties is the responsibility of the Royal College of Physicians and Surgeons of Canada. These examinations can be written at any time subsequent to the completion of training. For this reason it is difficult to obtain information regarding the number of graduates from each program.

- the basis for funding of postgraduate medical education is the budgeted total number of residency positions. As a result, the number of residents annually entering graduate medical education at each school is not fixed. Rather, it is a function of the number of residents who have completed or terminated training and left the program.

- although quota guidelines do exist at each school which define the number of resident positions which have been allocated to each program, flexibility is exercized in the allocation of positions between specialties.

- programs normally vary in length from 4-5 years.

- prior to entering a surgical residency, graduates must complete a one year internship. For medical residencies (clinical and laboratory) an internship is optional.

To develop the data presented in these tables which follow, each of the medical schools provided information regarding the number of positions which are currently allocated to each residency program and the length of training required to complete each program. These allocations were then divided by the number of years required for completion to determine the average current number of residents who will be able to enroll annually in each post-graduate program.

EXHIBIT 2

POSTGRADUATE TRAINING PROGRAMS FOR PHYSICIANS IN WESTERN CANADA

AVERAGE CURRENT NUMBER OF POSITIONS FOR ENTRY INTO TRAINING SPECIALTY

SPECIALTY	SCHOOL					
	UNIVERSITY OF BRITISH COLUMBIA	UNIVERSITY OF ALBERTA	UNIVERSITY OF CALGARY	UNIVERSITY OF SASKATCHEWAN	UNIVERSITY[1] OF MANITOBA	TOTAL
DICAL SPECIALTIES						
ternal Medicine	12	6	9	3.75	17	47.75
rdiology	1	2.5	1	1	2	7.5
itical Care	-	2	Projected	-	.3	2.3
rmatology	1.3	-	-	-	-	1.3
docrinology	-	1	-	-	.25	1.25
stroenterology	.5	1	1.5	-	-	3.0
riatric Medicine	-	-	-	-	.3	.3
ematology	.5	-	-	-	1	1.5
rology	1	.5	1.5	.5	-	3.5
fectious Diseases	-	1	-	-	.75	1.75
ysical Medicine & ehabilitation	2	1	Projected	1.3	.5	4.8
hrology	-	.5	-	-	.5	1
spiratory edicine	1	2	1.5	.25	.5	5.25
eumatology	-	1	.5	.25	-	1.75
TAL: MEDICAL PECIALTIES	19.3	18.5	15.0	7.05	23.1	82.95

EXHIBIT 3

POSTGRADUATE TRAINING PROGRAMS FOR PHYSICIANS IN WESTERN CANADA

AVERAGE CURRENT NUMBER OF POSITIONS FOR ENTRY INTO SPECIALTY TRAINING

SPECIALTY	SCHOOL					
	UNIVERSITY OF BRITISH COLUMBIA	UNIVERSITY OF ALBERTA	UNIVERSITY OF CALGARY	UNIVERSITY OF SASKATCHEWAN	UNIVERSITY[1] OF MANITOBA	TOTAL
SURGICAL SPECIALTIES						
General Surgery	3	3	3	4.25	11	24.25
Cardiovascular & Thoracic Surgery	1	1	-	-	.5	2.5
Thoracic Surgery	.5	-	-	-	-	.5
Neurosurgery	1	2	.5	.6	.5	4.6
Oral	-	-	-	-	-	1
Orthopedic Surgery	3.2	3	3	2	2	13.2
Otolaryngology	2.3	1	-	-	1.5	4.8
Plastic Surgery	1.5	1	1	-	1	4.5
Urology	1.7	1	-	-	1.5	4.2
TOTAL: SURGICAL SPECIALTIES	14.2	12	7.5	6.85	19	59.55
LAB SPECIALTIES						
General Pathology	3.8	1.25	-	2	2.5	9.55
Anatomical Pathology	1	1	2.25	-	-	4.25
Haematological Pathology	-	.25	-	-		.25
Neuropathology	.12	-	-	-	-	.12
Medical Biochemistry	1	.25	-	-	-	1.25
Microbiology	1.5	.25	-	-	.5	2.25
TOTAL: LAB SPECIALTIES	7.42	3	2.25	2	3	17.67

EXHIBIT 4

POSTGRADUATE TRAINING PROGRAMS FOR PHYSICIANS IN WESTERN CANADA

AVERAGE CURRENT NUMBER OF POSITIONS FOR ENTRY INTO SPECIALTY TRAINING

SPECIALTY	SCHOOL					
	UNIVERSITY OF BRITISH COLUMBIA	UNIVERSITY OF ALBERTA	UNIVERSITY OF CALGARY	UNIVERSITY OF[2] SASKATCHEWAN	UNIVERSITY[1] OF MANITOBA	TOTAL
OTHER SPECIALTIES						
aesthesia	8.7	3.5	4	3	6	25.2
mmunity Medicine	2.5	.5	-	-	1	4
ergency Medicine	-	-	1	-	-	1
agnostic Radiology	5.3	4	3[3]	2	3.5	17.8
clear Medicine	-	1	-	-	-	2
diation Oncology	.7	1.5	-	-	0.25	2.45
ediatrics	5	5	5	2.5	5	22.5
ychiatry	7.7	5.5	3.5	2	4	22.7
hthalmology	2.3	4[4]	-	1.3	2	9.6
stetrics and ynaecology	4	3	3	2	3.5	15.5
assigned	-	1	2	-	-	3
TAL: OTHER PECIALTIES	36.2	29	21.5	12.8	25.25	124.75
TAL: FAMILY RACTICE	13	20	38	20	14	105
TAL: ALL PECIALTIES[5]	90.12	82.5	84.25	48.7	84.35	389.92

Includes both M.A.T.H. and Non-M.A.T.H. postions

Entry position for 1 resident in each of the 1.2 year Genetics program and the 1 year Mental Retardation program have been excluded from these figures

University of Calgary emergency medicine program established by Canadian College of Family Physicians.

Increase from 2 to 4 to be realized by 1984

Position allocated for upgrading have been excluded from these totals. All positions funded by provincial government agencies and other agencies are included.

Province of
British Columbia

Province of
Alberta

Province of
Saskatchewan

Province of
Manitoba

WESTERN CANADA
HEALTH MANPOWER TRAINING STUDY

Category#5 - Report XXIII

PHYSICIANS

Report XXIII - PHYSICIANS

REPORT XXXIII

PHYSICIANS

THE REQUIREMENT FOR ALTERNATIVE TRAINING AND FUNDING ARRANGEMENTS IN WESTERN CANADA

WESTERN CANADA HEALTH MANPOWER TRAINING STUDY
CATEGORY #5 - REPORT XXXIII
PHYSICIANS

TABLE OF CONTENTS

		Page
I -	INTRODUCTION	I-1
	Study Background	I-1
	Study Objectives	I-2
	Study Approach	I-3
	Scope of This Report	I-4
	Limitations of the Data	I-6
	Report Structure	I-9
II -	PROJECTED SUPPLY AND REQUIREMENT FOR PHYSICIANS IN WESTERN CANADA	II-1
	Projected Supply	II-1
	Projected Requirement	II-2
	Net Requirement	II-3
	Timing and Location of Manpower Requirements	II-4
	Summary	II-5
	Occupational Issues	II-5
	Existing Training Programs	II-10
	Future Training Programs	II-11
III -	PROPORTIONAL RELATIONSHIP OF GENERAL PRACTITIONERS TO SPECIALISTS	III-1
	Introduction	III-1
	Current Ratios	III-1
	Occupational Issues	III-3
	General and Provincial Assumptions	III-5
	Methodology for Determining Manpower Requirements for the Specialties	III-5
	Physician Categories	III-7
	General Practitioners	III-8
	All Specialists	III-12

TABLE OF CONTENTS (Cont'd.)

		Page
IV -	MEDICAL SPECIALTIES	IV-1
	Internal Medicine	IV-3
	Anaesthesia	IV-9
	Community Medicine	IV-11
	Dermatology	IV-12
	Diagnostic Radiology	IV-16
	Emergency Medicine	IV-18
	Geriatric Medicine	IV-21
	Infectious Diseases	IV-24
	Neurology	IV-26
	Nuclear Medicine	IV-28
	Paediatrics	IV-30
	Physical Medicine and Rehabilitation	IV-33
	Psychiatry	IV-36
	Radiation Oncology	IV-38
	Laboratory Specialties	IV-41
V -	SURGICAL SPECIALTIES	V-1
	Cardiovascular and Thoracic, Thoracic, and Vascular Surgery	V-2
	General Surgery	V-5
	Neurosurgery	V-8
	Obstetrics and Gynaecology	V-10
	Ophthalmology	V-13
	Orthopedic Surgery	V-16
	Otolaryngology	V-19
	Plastic Surgery	V-21
	Urology	V-23

TABLE OF CONTENTS (Cont'd.)

		Page
VI -	FUTURE STRATEGIES	VI-1
	Introduction	VI-1
	All Physicians: Recommendations	VI-1
	Analysis of Training Requirements for General Practitioners	VI-4
	General Practitioners: Recommendations	VI-5
	All Specialists	VI-7
	Analysis of Training Requirements for the Medical and Surgical Specialties	VI-8
	Assumptions Underlying Specialty Training Recommendations	VI-9
	Factors Affecting Specialty Training Recommendations	VI-10
	Limitations of Specialty Training Recommendations	VI-12
	Medical Specialties: Recommendations	VI-14
	Internal Medicine	VI-14
	Anaesthesia	VI-15
	Community Medicine	VI-17
	Dermatology	VI-17
	Diagnostic Radiology	VI-17
	Emergency Medicine	VI-19
	Geriatric Medicine	VI-20
	Infectious Diseases	VI-20
	Neurology	VI-21
	Nuclear Medicine	VI-21
	Paediatrics	VI-21
	Physical Medicine and Rehabilitation	VI-23
	Psychiatry	VI-23
	Radiation Oncology	VI-24
	Laboratory Specialists	VI-25
	Surgical Specialties: Recommendations	VI-27
	Cardiovascular and Thoracic, Thoracic, and Vascular Surgery	VI-27
	General Surgery	VI-27

TABLE OF CONTENTS (Cont'd.)

Page

Surgical Specialties: Recommendations, con't.

Neurosurgery VI-28
Obstetrics and Gynecology VI-29
Ophthalmology VI-30
Orthopedic Surgery VI-31
Plastic Surgery VI-33
Urology VI-33

Other Recommendations VI-34

General Recommendations Applying to Medical Training Adjustments VI-34
Improving the Data Base VI-37
Ongoing Monitoring VI-40
Allocation of Training Positions Among Specialties VI-40
Internship Requirements for General Practitioners VI-41

VII - THE INTERRELATIONSHIP OF TRAINING RECOMMENDATIONS FOR OPTOMETRY AND OPHTHALMOLOGY

Introduction ..... VII- 1
Findings ..... VII- 1
Factors Affecting Training Recommendations for Optometry ..... VII- 2

TABLES

1. Projected Net Requirement for Physicians in Western Canada 1981-2000 ..... II-3

2. Projected Net Requirement for Physicians (by Province) II-5

EXHIBITS

		Opposite Page	Following Page
II-1	Projected Supply and Requirement for Physicians in the Western Region	II-1	
II-2	Projected Supply and Requirement for Physicians by Province	II-4	
II-3	Net Manpower Requirements		II-4
II-4	Impact of Age and Sex Change and Population Increase on Requirements for Physicians	II-6	
II-5	Graduate Training Programs for Physicians in Western Canada, Projected Number of Average Enrolments and Graduates	II-11	
III-1	Current Ratios of General Practitioners to Specialists	III-1	
III-2	Manpower Requirements for General Practitioners and Specialists in Western Canada	III-2	
III-3	Total Number of General Practitioners in Western Canada	III-8	
III-4	Age Distribution of General Practitioners		III-8
III-5	Factors Affecting Manpower Supply General Practitioners Western Canada		III-8
III-6	Net Manpower Requirements General Practice	III-16	
III-7	Total Number of Specialists in Western Canada	III-12	
III-8	Factors Affecting Manpower Supply Specialists, Western Canada		III-12
III-9	Net Manpower Requirements Specialists	III-13	

EXHIBITS (Cont'd.)

		Opposite Page	Following Page
IV-1	Total Number of Internists in Western Canada ...	IV-4	
IV-2	Age Distribution of Internal Medicine Specialists		IV-4
IV-3	Factors Affecting Manpower Supply, Internal Medicine Specialists, Western Canada		IV-4
IV-4	Net Manpower Requirements Internal Medicine Specialists	IV-7	
IV-5	Total Number of Anaesthetists in Western Canada	IV-9	
IV-6	Age Distribution of Anaesthetists		IV-9
IV-7	Factors Affecting Manpower Supply Anaesthetists, Western Canada		IV-9
IV-8	Net Manpower Requirements Anaesthesia	IV-10	
IV-9	Age Distribution of Community Medicine Specialists	IV-11	
IV-10	Manpower Requirements Community Medicine Specialists	IV-13	
IV-11	Age Distribution of Dermatologists	IV-14	
IV-12	Manpower Requirements Dermatologists	IV-15	
IV-13	Total Number of Diagnostic Radiologists	IV-16	
IV-14	Age Distribution of Diagnostic Radiologists		IV-16
IV-15	Factors Affecting Manpower Supply Diagnostic Radiologists, Western Canada		IV-16
IV-16	Net Manpower Requirements Diagnostic Radiologists	IV-17	
IV-17	Manpower Requirements Emergency Medicine Specialists	IV-19	
IV-18	Manpower Requirements Geriatric Medicine	IV-22	
IV-19	Manpower Requirements Infectious Diseases Specialists	IV-25	

EXHIBITS (Cont'd.)

		Opposite Page	Following Page
IV-20	Age Distribution of Neurologists	IV-26	
IV-21	Manpower Requirements Neurologists	IV-27	
IV-22	Manpower Requirements Nuclear Medicine Specialists	IV-29	
IV-23	Total Number of Paediatricians in Western Canada	IV-30	
IV-24	Age Distribution of Paediatricians		IV-30
IV-25	Factors Affecting Manpower Supply Paediatricians, Western Canada		IV-30
IV-26	Net Manpower Requirements Paediatrics	IV-31	
IV-27	Age Distribution of Physiatrists	IV-33	
IV-28	Manpower Requirements Physiatrists	IV-34	
IV-29	Total Number of Psychiatrists in Western Canada		IV-36
IV-30	Age Distribution of Psychiatrists		IV-36
IV-31	Factors Affecting Manpower Supply Psychiatrists, Western Canada		IV-36
IV-32	Net Manpower Requirements Psychiatrists	IV-37	
IV-33	Manpower Requirements Radiation Oncologists	IV-39	
IV-34	Total Number of Laboratory Specialists in Western Canada	IV-41	
IV-35	Age Distribution of Laboratory Specialists		IV-41
IV-36	Factors Affecting Manpower Supply, Internal Medicine Specialists, Western Canada		IV-41
IV-37	Net Manpower Requirements Laboratory Specialists	IV-43	

EXHIBITS (Cont'd.)

		Opposite Page	Following Page
V-1	Age Distribution of Cardiovascular and Thoracic Surgeons	V-3	
V-2	Manpower Requirements Cardiovascular and Thoracic, Thoracic, and Vascular Surgeons		V-3
V-3	Total Number of General Surgeons in Canada	V-5	
V-4	Age Distribution of General Surgeons		V-5
V-5	Factors Affecting Manpower Supply General Surgeons, Western Canada		V-5
V-6	Net Manpower Requirements, General Surgeons	V-6	
V-7	Age Distribution of Neurosurgeons	V-8	
V-8	Manpower Requirements Neurosurgeons	V-9	
V-9	Total Number of Obstetricians and Gynaecologists in Western Canada	V-10	
V-10	Age Distribution of Obstetricians and Gynaecologists		V-10
V-11	Factors Affecting Manpower Supply Obstetricians and Gynaecologists, Western Canada		V-10
V-12	Net Manpower Requirements Obstetricians and Gynaecologists	V-11	
V-13	Total Number of Ophthalmologists in Western Canada	V-13	
V-14	Age Distribution of Ophthalmologists		V-13
V-15	Factors Affecting Manpower Supply Ophthalmologists, Western Canada		V-13
V-16	Net Manpower Requirements Ophthalmologists	V-14	
V-17	Total Number of Orthopedic Surgeons in Western Canada	V-16	
V-18	Age Distribution of Orthopedic Surgeons		V-16

EXHIBITS (Cont'd.)

		Opposite Page	Following Page
V-19	Factors Affecting Manpower Supply Orthopedic Surgeons, Western Canada		V-16
V-20	Net Manpower Requirements Orthopedic Surgery	V-17	
V-21	Age Distribution of Otolaryngologists	V-19	
V-22	Manpower Requirements Otolaryngologists	V-20	
V-23	Age Distribution of Plastic Surgeons	V-21	
V-24	Manpower Requirements Plastic Surgeons	V-22	
V-25	Age Distribution of Urologists	V-23	
V-26	Manpower Requirements Urologists	V-24	
VI-1	Summary of Recommended Output of Medical Programs in Western Canada, 1987-2000: Graduate Programs and Postgraduate Programs in the Medical and Surgical Specialties		VI-1
VI-2	Training Requirements Major Specialties Western Region		VI-11
VI-3	Impact of Age and Sex Change on Requirements for Specialists		VI-11
VI-4	Training Requirements Major Specialties British Columbia		VI-11
VI-5	Training Requirements Major Specialties Alberta		VI-11
VI-6	Training Requirements Major Specialties Saskatchewan		VI-11
VI-7	Training Requirements Major Specialties Manitoba		VI-11
VI-8	Training Requirements Minor Specialties Western Region		VI-11

APPENDICES

		Page
A	Notes on Factors Affecting Manpower Supply	A-1
B	Net Provincial Manpower Requirements	B-1
C	Physicians: Control of Practice	C-1
D	Bibliography	D-1

CHAPTER I

I - INTRODUCTION

This chapter provides a brief overview of the Western Canada Health Manpower Planning Study, followed by a description of this unit of the study: the manpower and training requirements for physicians. The limitations of the existing data base are discussed, and then the structure of the rest of the report is explained.

STUDY BACKGROUND

The provision of effective health services to the community is, to a considerable degree, dependent on three essential resources:

- an adequate supply of well trained specialist staff in each health occupation group;
- the development of adequate facilities to service the community;
- the availability of adequate funds to ensure cost-effective and efficient health services.

The range and complexity of health treatment programs have expanded greatly in Canada during the last twenty-five years. In addition, changing technology and the development of new treatment programs have resulted in an increased requirement for skilled, adequately trained health manpower. These factors have necessitated an increased emphasis on manpower planning and skill training for health occupations to ensure an adequate supply of trained practitioners to meet defined manpower requirements.

Physicians represent the most important health occupation in the Canadian health care system. As primary responsibility for assessing patients and

establishing treatment methods rests with physicians, this group determines the nature and extent of utilization of the health care system. As such, the size, range of skills, distribution and scope of practice of this health group has a major impact on the health care system.

STUDY OBJECTIVES

The Western Canada Health Manpower Training Study was initiated by the Western Premiers at their annual conference in 1980.

The objectives of the study were to:

- assess the existing and future needs for health manpower training programs and facilities in Western Canada;
- make recommendations for the rationalization of the location and funding of health manpower training programs and facilities in Western Canada.

STUDY APPROACH

The study was under the direction of a Steering Committee consisting of health and education government representatives from the Provinces of British Columbia, Alberta, Saskatchewan and Manitoba. The study took place over two years and consisted of a review of 26 health occupations grouped into five categories.

Each occupation was studied separately and a report has been produced for each. In addition, a report examining the inter-relations of the occupations has been submitted to the Steering Committee.

Category 5 comprised physicians and the various Specialties within medicine. Data was collected from the provincial Colleges of Physicians and Surgeons, provincial associations, and from goverment agencies for each of the occupations. An attempt was also made to gather data on historical trends, the number of graduates from training, trends in migration to or from other provinces, immigration, emigration, age distribution, and retirement. In cases where validated and reliable information was not available, officials of the Colleges of Physicians and Surgeons, manpower planners, association spokesmen, government representatives, and practitioners in the various medical specialties were interviewed to provide qualitative opinions on the present and future trends affecting the supply of and requirement for physicians. Because of the interdependency of the Canadian and international medical communities, the opinions of physicians and health manpower planners in other provinces in Canada and in the United States were also obtained.

An extensive literature review was conducted to examine the issues surrounding the medical profession and the relevant research which has been undertaken with regard to these issues. We reviewed earlier studies conducted by medical bodies, governments and manpower planning commissions, as well as recent journal articles. A bibliography of the literature reviewed is contained in Appendix D to this report.

A health manpower computer model was developed to assist in the preparation of projections on the future supply and requirement for each occupation. A critical analysis of these twenty-year projections was then undertaken to develop the various supply and requirement scenarios presented in the report.

The lack of a consistent historical data base made it difficult to develop accurate or reliable long-range projections of supply or requirement for medicine and its component specialties. (Data limitations are discussed later in this chapter.) The supply and requirement projections contained in this

report are, it is believed, as accurate as can be achieved in light of the data base now available.

A decision-making process with respect to the future funding and location of training programs was developed for this study. In medicine, each province presently has its own graduate and postgraduate programs. This study focused on the general requirement for training programs rather than on the specific level or length of training to be provided. The funding of these programs was not examined, as each province is responsible for its own training programs for medicine. This change in the approach to the study was agreed to by the Steering Committee.

Separate documents describing the manpower planning methodology and the scope of existing training programs were submitted to the Steering Committee.

SCOPE OF THIS REPORT

Two major issues must be answered by manpower planners with respect to physicians:

- how many physicians are required and how many should be trained to meet this requirement,
- what is the appropriate ratio of general practitioners to specialists.

This report addresses both these issues within a 20-year time frame, 1981 to 2000. The manpower requirements for physicians viewed as a single group are addressed first. These are aggregated for Western Canada as a whole and are also examined separately for each province.

Next, the "universe" of physicians is divided into two categories: general practitioners (family physicians) as one category, and all specialists (viewed as a single group) as the other. The manpower requirements and the associated postgraduate training requirements for each category are identified.

Finally, each of the 39 medical and surgical specialties recognized by the Royal College of Physicians and Surgeons of Canada is reviewed.

Definitions for the purposes of this study are provided below for physicians, general practitioners and family physicians, and for specialists. (Definitions for the individual specialties appear in chapters IV and V).

Definitions

A physician is defined as an individual who is "concerned with preventing, diagnosing and treating human illnesses. Activities include: conducting medical examinations, making diagnoses, prescribing and giving treatment for diseases, disorders and injuries of the human body and applying preventive medicine as well as rehabilitative techniques; performing surgical operations in the treatment of injuries, diseases and disorders of the human body and engaging in clinical research within the field of activities and scope of competence."[1]

Physicians may be subdivided into 2 groups as follows:

- o General practitioners and family physicians

  "Medical doctors to whom the public has direct access for diagnosis and treatment without being restricted by age, sex or category of illness, and who assume ongoing responsibility for the overall mental and physical well being of their patients within their proven competence."[2]

- Specialists

  "Physicians who, after specific post-graduate training, have obtained certified qualification in a restricted field of medicine from the Royal College of Physicians and Surgeons or la Corporation professionnelle des medecins du Quebec and mostly perform medical acts at secondary and tertiary levels on referred patients."[2]

Throughout this report, we have used the term "General Practitioner" to refer to both general practitioners as well as family physicians. Although the different terms are used in different provinces, this common terminology has been adopted throughout this report.

The Royal College of Physicians and Surgeons of Canada is responsible for the establishment of standards of professional competence and the certification of medical specialists according to those standards.

LIMITATIONS OF THE DATA

Data related to the number and activities of Canadian physicians and certified specialists in Canada was obtained primarily from the Colleges of Physicians and Surgeons of each province and from the respective provincial governments.

Given the impact which this vitally important profession has on the delivery of health care, it is surprising that a satisfactory data base is not available. Inadequacies of the existing data base are described below.

---

1. Canadian Classification and Dictionary of Occupations No. 1116, 1980 Revision.

2. National Committee on Physician Manpower. Requirements for Physicians in Canada: Report of the Requirements Committee. Ottawa: Health and Welfare Canada, 1975.

Number and Activities of Fee-for-Service Physicians

During the course of this study, several shortcomings were identified which limit the reliability and comparability of information in the existing data base. For example:

- no standard code is applied to classify physicians as to their certified or functional specialties; thus, it is difficult to make comparisons from province to province,
- information related to migration, immigration, and emigration is not adequate,
- information is not available regarding full-time versus part-time practitioners since most physicians (unlike most health professionals) do not receive salaries which correspond to set hours of work,
- accurate information on the actual age of retirement or on the reduction in the volume and scope of services provided by physicians is not available.

Utilization Data on Medical Services

The health care insurance system for each province collects a large amount of data in the course of processing billings from fee-for-service physicians. No province appears to be making effective use of this data base to analyse medical manpower requirements or the efficiency and effectiveness of medical services provided.

Non Fee-For-Service Medical Activities

Certain physician activities are not reported as part of the utilization data currently collected. For example, a number of medical specialties are traditionally reimbursed on a salaried rather than on a fee-for-service basis. As a result, little information is obtained on their services. Such specialty groups include physiatrists and radiation oncologists. Other physicians may

serve in teaching, research, government, industry or administration and, as a result, may not be involved in fee-for-service activities to any great extent.

Currently, the accepted method of determining the number of full-time active physicians involves counting those receiving annual fee-for-service payments of $20,000 - $25,000 or more. This method does not take into consideration the activities described above. Nor is it sensitive to the varying levels of physicians' reimbursement between various specialties.

Functional Specialists

The discipline in which physicians receive certification cannot be used to determine the services which are being provided (or are available) for the following reasons:

- many foreign medical graduates who received certification in a specialty in the country in which they trained have not received certification in Canada. Although these physicians are classified as General Practitioners in Canada, many are serving as specialists providing services in the area of their training,

- a proportion of Canadian physicians do not immediately receive their specialty certificate upon completing residency training. Others never receive certification, while some may not complete residency training. It can be assumed that many of the services provided by these physicians who are classified as general practitioners are in the specialty in which they received training,

- medical students, interns and residents also provide medical services under supervision, and a significant proportion of their activities are in the various specialty areas,

- general practitioners and family physicians often acquire sufficient specialty training to perform certain specialty services,

- aging specialists may reduce the specialty component of their practice and increase the general practice component. This is particularly applicable to the surgical specialties,

- certified specialists may wish to supplement the volume of specialty work referred to them by providing primary care services which may or may not be related to their specialty,

- significant overlaps exist in the ranges of services which general practitioners/family physicians and the various medical and surgical specialists are trained to provide.

Training Output

The nature of postgraduate training in a medical specialty is unique in the health care environment in two respects.

First, enrolments in specialty training programs are controlled by the total number of residents in postgraduate training rather than by the number of students who are admitted to a given program in a given year. Although guidelines exist for each program, these are flexible and are related to the total enrolment rather than the number of new students admitted annually.

Second, it is the Royal College of Physicians and Surgeons of Canada rather than various medical schools that is responsible for examining and certifying the physicians who have completed specialty training.

For these reasons, it is difficult to obtain accurate information regarding:

- the number of residents in each program,
- the number of residents who have completed training,
- the proportion of residents who are eventually certified,
- the geographic area in which each specialist initiates practice.

These various limitations of the data base are addressed in recommendations contained in Chapter VI of this report.

REPORT STRUCTURE

Chapter II summarizes the projected supply and requirements for all physicians viewed as a single group in Western Canada. A province-by-province analysis of manpower requirements for the next twenty years is provided. The detailed exhibits supporting these analyses are contained in Appendix B.

Occupational issues which have a bearing on the requirement for all physicians are also discussed in Chapter II. Occupational issues relating to particular specialties are identified in the sections on each of the specialties in Chapters IV and V. The occupational issues pertaining to all physicians apply equally, of course, to each of the specialties, and the sections on specialty occupational issues should be read with this in mind.

Finally, the existing training programs are briefly described.

Chapter III examines the proportional relationship of all general practitioners/family physicians viewed as a single group to all specialists viewed as a single group. Manpower requirements for each of these groups are projected so as to provide as comprehensive an analysis as possible. The supporting statistical exhibits for these two groups appear in the text of Chapter III.

Chapter IV presents analyses of the net manpower requirements for the Clinical and Laboratory Specialties comprising the Division of Medicine of the Royal College of Physicians and Surgeons of Canada. Internal Medicine and its subspecialties are treated as a single group, as are the six laboratory

specialties. All other Clinical specialties are analysed individually. Supporting statistical exhibits appear in the text on each specialty.

Chapter V deals with the manpower requirements for the surgical specialties comprising the Division of Surgery of the Royal College of Physicians and Surgeons of Canada. Thoracic, Vascular, and Cardiovascular and Thoracic Surgery are treated as a single group. Paediatric General Surgery is commented on in the General Surgery section. All other Surgical specialties are analysed individually. As in Chapter IV, supporting statistical exhibits accompany the text on each specialty.

The general pattern used (in Chapters II, III, IV, V and Appendix B) to present the results of the analysis for each defined group of physicians comprises the following elements:

- Manpower Stock, providing the current (1980) supply of manpower for the defined group,

- Factors Affecting Manpower Supply, identifying the numerical values assigned to five factors (net migration, net immigration, net occupational shift, training output, and attrition) which could affect manpower requirements. Note that this analysis was undertaken for the ten major specialties only,

- Calculation of Requirements, explaining which ratios were used to determine net manpower requirements and how the ratios were arrived at,

- Net Manpower Requirements, providing the projected net requirements for the ten major specialties. For the minor specialties, total manpower requirements are provided,

- Occupational Issues, providing a brief discussion of non-quantifiable issues that could affect manpower requirements for many of the defined groups.

Chapter VI presents recommendations for adjustments in medical training programs and other, non-training recommendations.

Appendix A contains a set of common notes. In the case of the ten major specialties, the exhibits showing the factors which affect the manpower supply are supplemented by a set of lengthy notes. Because these notes on the factors are identical for each specialty, they have been put into Appendix A. References to Appendix A appear on the appropriate exhibits.

Appendix B contains the general and provincial assumptions made with regard to all physicians treated as a single group. It also provides details on the methodology for calculating manpower requirements, and an analysis of the occupational issues that affect net physician manpower requirements. Appendix B has its own table of contents.

Appendix C provides a brief summary of each province's measures for controlling the practice of medicine.

Appendix D is a bibliography of the documentation reviewed in this study. The most important body of published work is that contained in the three-volume report of the Requirements Committee of the National Committee on Physician Manpower, published by Health and Welfare Canada in 1975. The present study has drawn heavily on this report, and it is, accordingly, frequently cited. For brevity's sake, it is referred to as the National Committee on Physician Manpower (1975).

CHAPTER II

II - PROJECTED SUPPLY AND REQUIREMENT FOR PHYSICIANS IN WESTERN CANADA

In this chapter, projections of the supply and requirement for physicians in the Western Region are summarized, and the timing and location of these manpower requirements are presented for each province. Explanations of the methodology used and the assumptions made in developing the most likely supply and requirement projections for each province are provided. Further detail is contained in Appendix B. The supply and requirement projections are as accurate as can be achieved on the basis of the data currently available.

To determine the number of physicians that will be required, this report relies heavily upon a study which was conducted in 1975 by the National Committee on Physician Manpower titled "Requirements for Physicians in Canada."

A discussion of the rationale for using the guidelines identified in the National Committee report follow. It should also be noted that any further reference to the "committee" or the "national committee" refers to the authors of the "Requirement for Physicians in Canada" report.

Rationale for Adopting Guidelines from the National Committee Report

To develop projections of the number of physicians and specialists that will be required in Western Canada guidelines proposed by the National Committee on Physician Manpower have been used to a great extent. Prior to adopting this approach, alternatives were considered.

Several studies which have addressed the issue of physician requirements were reviewed.

One of these studies, titled the "Report of the Graduate Medical Education National Advisory Committee" (GMENAC), prepared for the U.S. Department of Health and Human Services, has been discussed widely. The primary focus of this study was to achieve a balance between the supply and requirements of physicians in the U.S. in the 1990's.

It was decided that GMENAC would not be used as a basis for determining the future physician manpower needs in Western Canada. The following factors lead to the decision:

- to determine requirements in this study, a delphian approach was used. Groups of physicians representing the various specialities reviewed the issues, and identified the volume of medical services that will be required (and requested) by the future population, and subsequently determined the number of practitioners needed to provide those services. This represents a very soft approach which is not based upon a measure of actual services being provided. (Some utilization data was used as a check of the projections which were developed, but the data base in the U.S. is not as comprehensive as the information compiled in Canada and cannot be used satisfactorily to determine requirements);

- as medical services must be purchased or privately insured in the United States, decisions to seek medical services are determined by economic, as well as health factors. It is more difficult to determine true medical needs in such an environment. This environment does not reflect the Canadian situation where economic barriers to obtaining medical care have been significantly reduced by government sponsored health insurance; and

- the methods for delivery of health services differ between the United States and Canada. In Canada, the general practitioner has

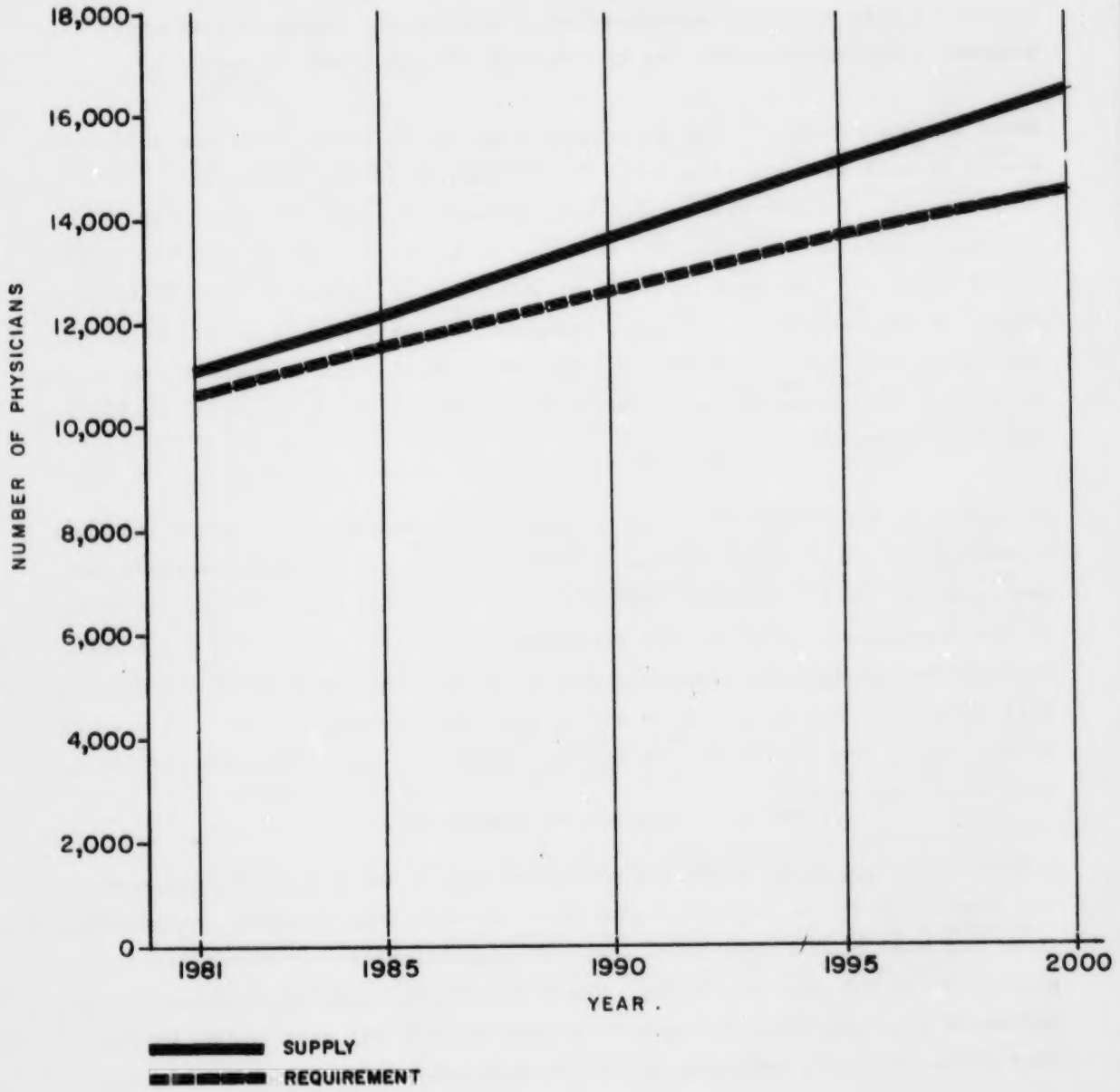
been identified as the point of initial contact for persons wishing medical care while in the U.S.; the patient chooses the qualifications of the physician he wishes to approach. Internists, obstetricians and gynecologists, and paediatricians as well as general practitioners are identified as providers of primary care in the American health care delivery system. As a result, the U.S. requires proportionately more specialists and fewer general practitioners than Canada.

In discussions with medical specialists, medical educators, and manpower planners it was generally accepted that the guidelines presented in the National Committee report were superior to any others which have been published. This study was finalized in 1973 based on data collected in 1973 and earlier. Its overall objective was to determine the future (1981) requirements for physicians which would ensure the availability of appropriately qualified manpower without creating an oversupply. A discussion of the rationale which lead to the eventual decision to utilize the National Committee guidelines as a basis for the projection of manpower requirements in Western Canada follows.

The requirements for physicians were determined through analysis of the medical services that would be required by the future Canadian population. These required services were identified through analysis of utilization data. For each type of medical procedure, the amount of time required by a physician to provide the service was estimated. These times were applied to the utilization data to calculate the total amount of time that would be necessary to provide all required services. This calculation was adjusted to take into consideration such factors as the expected work week of a physician in the future, women in medicine, changing technology, changing demographics, etc. The number of physicians required in the future was then determined, and resulting service target ratios calculated.

EXHIBIT II-1

PROJECTED SUPPLY AND REQUIREMENT FOR PHYSICIANS IN THE WESTERN REGION



Many believe that the need for medical services in Canada is closely reflected in the actual services provided as few barriers limit a citizen's access to medical services. As a result, the approach used by the National Committee in which comprehensive data on all fee-for-service activities was analyzed provides a more accurate determination of the medical needs, and subsequently, manpower requirements, than can be obtained through a delphi approach.

Based on these facts, it was determined that the National Committee guidelines should be used as a starting point in determining future physician requirements. Further discussions with representatives of the medical profession were held to identify the need to adjust any of the service target ratios which may have been in error or which may no longer be applicable as a result of new technology, changing demographics, or other factors. No strong cases were made for adjustments and the majority of practitioners accepted the guidelines identified by the National Committee for the purposes of projecting future requirements.

It should be noted that the Royal College of Physicians and Surgeons convened a meeting two years ago to review the manpower planning guidelines which had been proposed by the National Committee. The president and secretary of each of the professional associations respresenting the 33 specialties which were reviewed by the National Committee were present. The findings of the meeting were that, with the exception of one or two small subspecialties, the service target ratios recommended by the National Committee had proved appropriate and were still applicable.

Exhibit II-1, opposite, shows the projected supply and projected requirement for physicians in the Western Region from the year 1981 to 2000. At present, there are some 11,000 physicians (general practitioners and specialists) practicing in the four provinces. Based on current training programs, it is estimated that this will increase to 12,000 by 1985 and over 16,000 by the year 2000. The data indicates a current requirement for 10,600 physicians

which will increase to 14,600 by the year 2000. This produces a net surplus of physicians of some 500 in the period 1981 to 1985 and increases to 2,000 in the year 2000. (Detailed statistics are provided in Exhibit II-3, later in this chapter.) The factors used to develop these projections are set out below.

PROJECTED SUPPLY

The projected supply shown in Exhibit II-1 is based on the analysis of the output from the health manpower computer model developed for this study. The model used an opening stock figure representing the number of active physicians licensed in each Province. This figure was determined using data provided by the respective Colleges of Physicians and Surgeons.

Based on the opening stock figure developed, the computer then added or subtracted, for each year from 1981 to 2000, a numerical value assigned to each of the following factors which could affect manpower supply:

- net migration - defined as the movement of physicians from one province to another province. Migration into each province was subtracted from migration out of that province to arrive at a net migration factor;

- net immigration - defined as the movement of physicians from one country to another country. The number of emigrants from each province was subtracted from the number of immigrants to that province to arrive at a net immigration factor;

- training output - defined as the number of anticipated graduates from graduate medical education programs in each province;

- o net occupational shift - defined as the net movement of physicians from active to inactive status or from inactive to active status and movement into the medical profession from another profession or movement out of the medical profession to another profession. Physicians involved in government, industry, education and administration have been included in the active physician category and are not considered to be professionals who have shifted occupations;

- o attrition - defined as the age at which physicians retire from active medical practice.

PROJECTED REQUIREMENT

The projected requirement for physicians, shown graphically in Exhibit II-1 and statistically in Exhibit II-3, was calculated by means of three methods:

- o historical (population) ratio;
- o utilization method;
- o service target ratio.

Historical (Population) Ratio

For each province, the current ratio of physicians to population was used to project the number of practitioners required in the future to maintain the current level of manpower in terms of physicians per population. This ratio varied from province to province.

Utilization Method

Utilization data detailing the practice patterns of the various specialty groups was obtained from each of the western provinces. Using the current

ratio of physicians to population, the effects of the demographic changes projected for the populations of the western provinces was used to calculate manpower requirements.

Service Target Ratio

Based on the findings of the National Committee on Physician Manpower (1975), a standard ratio indicating the size of a population which could justify a physician was applied. This ratio is 1:630 or 1 physician per 630 persons.

NET REQUIREMENT

The projected supply minus the projected requirement equals the net requirement for physicians in the Western Region. Based on the analysis of data for the four provinces, the net requirement for physicians is as follows:

TABLE 1

PROJECTED NET REQUIREMENT FOR PHYSICIANS IN WESTERN CANADA 1981 - 2000

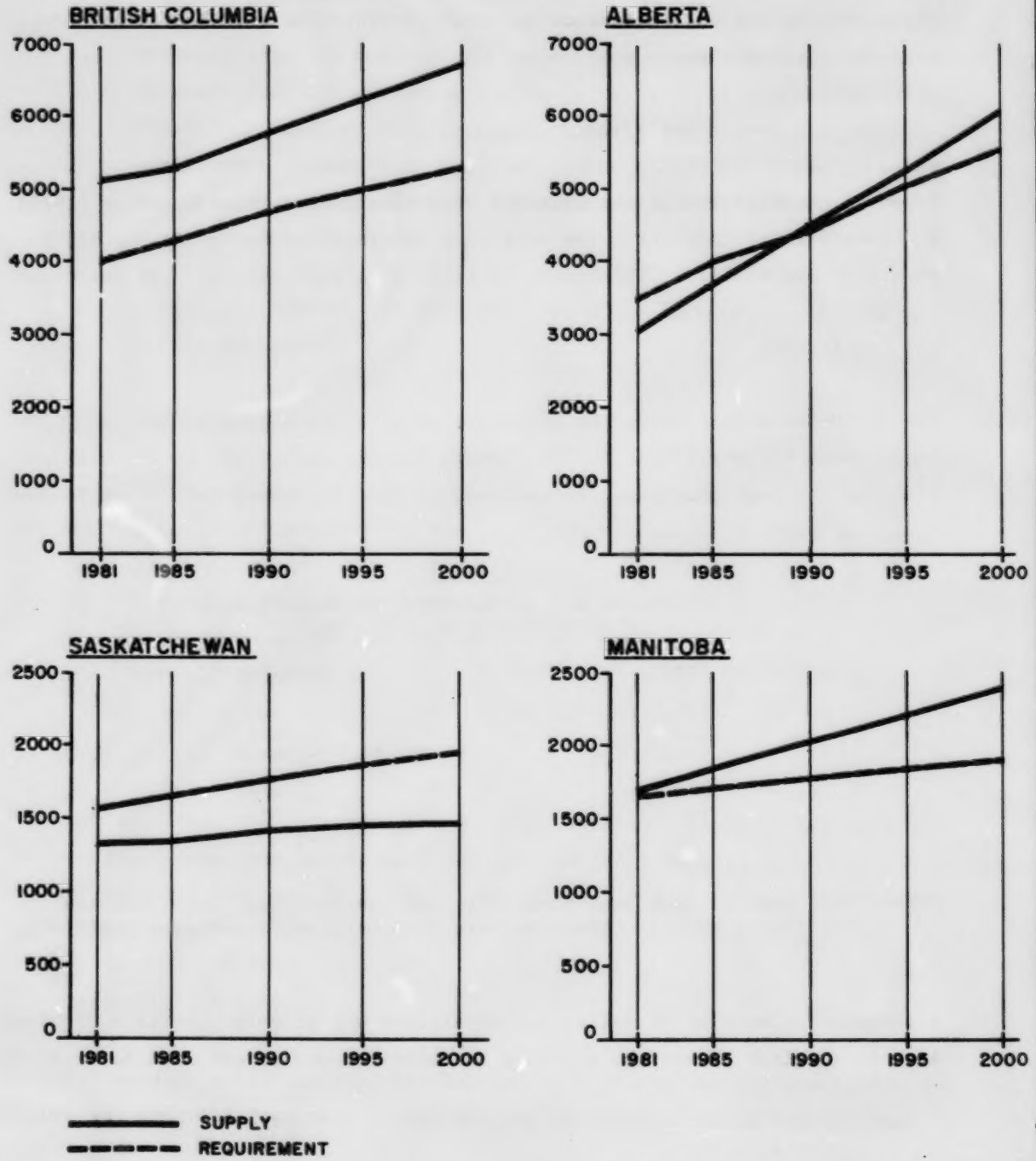
Year	Net Requirement
1981	- 500
1982	- 480
1983	- 460
1984	- 470
1985	- 500
1990	- 970
1995	-1,400
2000	-1,900

Notes: All numbers have been rounded to the nearest ten. Surpluses are indicated by (-). These numbers have been extracted from Exhibit II-3.

Although this surplus of additional physicians may alleviate certain problems such as the lack of medical manpower in remote areas, it can also be expected

EXHIBIT II - 2

PROJECTED SUPPLY AND REQUIREMENT FOR PHYSICIANS BY PROVINCE



to result in an increase in the total cost of health services as more physicians provide more services to the public.

TIMING AND LOCATION OF MANPOWER REQUIREMENTS

Exhibit II-2, opposite, depicts in graphic form the projected supply and manpower requirement in each of the four Western Provinces over the next 20 years. Exhibit II-3, overleaf, provides the statistical data on which the graphs are based.

British Columbia

British Columbia, with some 5,000 physicians, is currently experiencing a significant surplus of physicians (approximately 1,100) which will remain relatively constant until 1990. The surplus is projected to increase from 24% of total requirements in 1990 to 27% by the year 2000.

Alberta

Alberta currently has a requirement for some 400 additional physicians which will decline slightly through the 80's. By 1990, a balance between supply and requirement should be achieved, and by the year 2000, a surplus of some 500 physicians, representing less than 10% of the required number of physicians, will exist.

Saskatchewan

Saskatchewan presently has a requirement for 200 additional physicians which will increase in relation to the growth in population to the year 2000. The ongoing net requirement increases from 15% of the total requirement in 1981 to 26% in the year 2000.

EXHIBIT II-3

NET MANPOWER REQUIREMENTS

MOST LIKELY SCENARIO

PHYSICIANS

Year	B.C.		Alberta		Sask.		Manitoba		Western Canada	
	Stock	Req.	Stock	Req.	Stock	Req.	Stock	Req.	Stock	Req.
1981	5073	3954	3049	3420	1318	1551	1686	1672	11112	10611
NET		-1119		371		233		-14		-501
1982	5109	4031	3200	3552	1329	1573	1697	1695	11335	10851
NET		-1078		352		244		-2		-484
1983	5152	4108	3351	3692	1340	1596	1722	1706	11565	11102
NET		-1044		341		256		-16		-463
1984	5217	4184	3502	3824	1351	1620	1747	1717	11817	11345
NET		-1033		322		269		-30		-472
1985	5282	4260	3653	3939	1362	1643	1772	1728	12069	11570
NET		-1022		286		281		-44		-499
1990	5757	4643	4498	4488	1412	1756	1972	1785	13639	12672
NET		-1114		-10		344		-187		-967
1995	6232	4976	5258	5016	1427	1858	2172	1834	15089	13684
NET		-1256		-242		431		-338		-1405
2000	6707	5277	6018	5531	1437	1950	2372	1873	16534	14631
NET		-1430		-487		513		-499		-1903

Note: These figures are based on the most likely scenario and a service target ratio of 1:630.

Surpluses are indicated by (-).

Manitoba

Manitoba will increase the size of its current surplus of physicians from 14 to 214 by 1985. This surplus of physicians is projected to increase steadily to the year 2000, at which time there will be a 27% surplus in the total physician requirements.

SUMMARY

Based on the projected supply and projected requirement shown in Exhibit II-2 and II-3, the net requirement for physicians in each province is summarized as follows:

TABLE 2

PROJECTED NET REQUIREMENT FOR PHYSICIANS

	British Columbia	Alberta	Saskatchewan	Manitoba
1981	-1120	370	230	-10
1985	-1020	290	280	-40
1990	-1110	-240	430	-190
2000	-1430	-490	510	-500

Note: All numbers have been rounded to the nearest ten.
Surpluses are indicated by (-).

This projected level of net manpower requirement for physicians suggests that there will be a significant surplus of physicians in Western Canada. The projections shown in Table 2 represent the best estimates which can be developed based on the existing data base.

EXHIBIT II-4

IMPACT OF AGE AND SEX CHANGE AND POPULATION INCREASE ON REQUIREMENTS FOR PHYSICIANS

	British Columbia	Alberta	Sask.	Manitoba
Projected Percentage Increase in Requirements for Physicians from 1981 to 1990:				
. Due to Age and Sex Change	1.8%	-0.2%	1.4%	0.7%
. Due to Population Increase	18.5%	31.2%	13.3%	5.9%
. Total Projected Increase	20.3%	31.0%	14.7%	6.6%
Projected Percentage Increase in Requirements for Physicians from 1981 to 2000:				
. Due to Age and Sex Change	4.5%	1.1%	1.6%	0.3%
. Due to Population Increase	35.8%	61.7%	25.8%	14.0%
. Total Projected Increase	40.3%	62.8%	27.4%	14.3%

OCCUPATIONAL ISSUES

Although the extent to which the issues identified below will affect the future practice of medicine is unknown, most of these factors are likely to result in increased requirements for physician training.

Demographic Changes and Population Aging

In Exhibit II-4, opposite, the projected effects of age and sex change and population increase are identified. These figures were obtained through a comparison of the manpower projections identified in Appendix B.

The increase in requirements for physicians that will be caused by anticipated growth in the size of the population is reflected in the projections which are developed using the population method. The projections developing using the utilization method reflect the effects of demographic change which includes population increase.

Since each of the projection methods utilize the same figure for the number of physicians required in 1981 (actual supply of active physicians), the results of the two projections can be compared for the purpose of isolating the effect of age and sex changes from the larger factor of population growth.

The analysis indicates that demographic change and aging will not significantly increase the requirements for physician services. The requirement for physician services as a result of demographic change will increase less than 2% both between 1981 and 1990 and between 1981 and 2000. British Columbia is an exception: between 1981 and 2000 requirements for physician services are projected to increase 4.5% as a result of demographic change.

The full impact of the aging of the Western Canada population upon demand for medical services will not be realized until 2010 - 2030.

The aging of the population will not affect all medical specialties equally. Requirements for paediatricians and obstetricians may decline, while the need for the specialists such as internists and cardiovascular surgeons may increase.

Population Increase

Growth in the Western Canadian population will result in an increased requirement for physicians. This increase is projected to have its greatest impact in Alberta.

Urbanization

The trend towards urbanization will result in more and larger clusters of population which will facilitate the development of more highly specialized health care services at the secondary and tertiary care level. This may also result in a proportionate increase in the need for specialists and subspecialists and a proportionate decrease in the requirement for generalist physicians in large urban centres.

Demand for Medical Services

It is generally accepted that as the public increases its knowledge regarding health care, expectations for service also increase, resulting in patient-generated demand for medical services.

Physician Productivity

In recent years, physicians have generally increased their productivity, permitting them to deliver more services in the same time period. It is unlikely that significant further increases in hourly productivity can be achieved. Rather, the number of services performed per physician may decline as a result of increased emphasis on patient counselling, increases in the number of salaried physicians, or other governmental adjustments in the reimbursement mechanisms for physicians.

The National Committee on Physician Manpower (1975) found that physicians generally work 48 hours per week excluding hours involving on-call, committee work, etc. Thus, the greater emphasis on leisure time combined with an increase in the supply of physicians may result in a reduction in the total number of hours worked by physicians.

Use of Allied Health Professionals

Over the past ten years, there has been greater emphasis on the development of new health occupations as well as on expanding the roles of traditional occupations to assist physicians. For example, nurse practitioners, non-physician anaesthetists and other health professionals have been developed to augment the services of physicians. If this trend continues in the future, the need for medical practitioners may decrease.

Women in Medicine

Presently, approximately 15% of practicing physicians in Canada are women and it is projected that this figure will increase to 40% in the next 30 years. Currently, women comprise some 50% of most medical schools' students.

One Quebec study suggests that women in full-time practice provide 30% fewer services. A United States study shows that female physicians provide 68% of the services provided by their male equivalents over their working lives. Should this trend develop throughout Canada, more physicians will be required to deliver the same number of services.

Female practitioners are unevenly distributed through family practice and the specialties. As a result, the effect of women in medicine will have a greater impact in certain specialties than in others.

The increase in the proportion of women graduating from medical school may have the greatest effect on the requirements for physicians in the future. The data currently available is not sufficient to determine the impact which women will have on requirements. Trends in the participation of women in the medical workforce should be assessed regularly as additional information becomes available.

Increasing Trend Towards Specialization

Approximately 15% of surgery in Canada is performed by physicians other than certified surgical specialists. There is an increasing trend towards restricting major surgery to certified surgeons and general decreases in surgery performed by general practitioners. If surgery were restricted to certified specialists, the requirement for surgeons would probably increase.

The evolution of the role of the family physician will affect the requirements for specialists who provide primary and secondary care. If these practitioners focus on their provision of care on one or more segments of the population, the need for paediatricians, internists, obstetricians, surgeons or other specialists may be reduced.

New Medical Technology

Certain technological advances simplify diagnostic and therapeutic procedures and reduce physician requirements. Examples of these technological developments include ultrasound and fiber optics techniques which have reduced the requirements for exploratory surgery. Development of other procedures may increase physician demand or shift demand from one specialty group to another. Although it is difficult to predict where these technological advances will occur, it is reasonable to assume that major changes will occur and that these will greatly affect physician requirements. Just as history has shown the impact of new drugs in fields such as diabetes, tuberculosis, and psychiatry, dramatic developments in surgical techniques, cancer treatment, or cardiovascular disease will influence the need for physicians.

Incidence of Disease

As medical knowledge increases and society changes, the diseases which affect the population and the type of specialty training required for their diagnosis and treatment will continue to evolve. Diseases which are predicted to have a greater impact in the future are cancer, heart disease and respiratory ailments.

Government Policy

Funding bodies responsible for services provided by health insurance systems may affect the future practice of medicine through adjustments to the types of services insured, the qualifications needed to provide certain services, the reimbursement mechanisms or the number of practitioners able to bill the insurance plans. Recent events in many provinces across Canada indicate a growing concern by physicians and the public regarding physician reimbursement practices.

Impact of Other Canadian Medical Schools

Recent reports suggest that the projected enrolments of the five medical schools in Ontario will result in a surplus of physicians for that province. If the enrolments of these Ontario schools are not reduced, increased migration of graduate physicians to Western Canada may occur.

Summary

The effect that all these occupational issues will have on the requirements for physicians cannot be accurately projected. However, the possible effects of three of the factors identified above - women in medicine, the increased emphasis on leisure time, and reduced hourly productivity - were considered. A sensitivity analysis was conducted to determine their effects, and is described in Appendix B (page B-4).

This study has relied heavily on the report of the National Committee on Physician Manpower (1975) for the guidelines used to develop service target ratios and, subsequently, future physician manpower requirements. Both the Working Parties and the Requirements Committee which were responsible for developing the service target guidelines considered many of the occupational issues addressed above and adjusted their final recommendations as to these appropriate ratios in this study.

Because the occupational issues have, to some extent, already been recognized and because of the limitations of the existing data base, it was considered inappropriate to make further adjustments to compensate for the effects of these occupational issues in this study.

EXHIBIT II-5

GRADUATE TRAINING PROGRAMS FOR PHYSICIANS IN WESTERN CANADA
PROJECTED NUMBER OF AVERAGE ENROLMENTS AND GRADUATES

Province and Institution	Projected number of average Enrolments and Graduates										Source
	Enrolments					Graduates					
	1981	1982	1983	1984	1985	1981	1982	1983	1984	1985	
British Columbia . University of British Columbia	120	120	120	120	120	81	81	88	110	110	1
Alberta . University of Alberta . University of Calgary	118 72	118 72	118 72	118 72	118 72	110 68	110 68	110 68	110 68	110 68	2 3
Saskatchewan . University of Saskatchewan	64	64	64	64	64	61	53	60	59	61	4
Manitoba . University of Manitoba	95	95	95	95	95	90	90	90	90	90	5
Total Projected for Western Canada	469	469	469	469	469	410	402	416	437	439	

SOURCE:

1. University of British Columbia
2. University of Alberta
3. University of Calgary
4. Univerity of Saskatchewan
5. University of Manitoba

EXISTING TRAINING PROGRAMS

There are currently five formal training programs for physicians at universities in Western Canada. These universities are the University of Manitoba, the University of Saskatchewan, the University of Calgary, the University of Alberta, and the University of British Columbia.

The programs require four years to complete, with the exception of the University of Calgary where the program is scheduled to require three years.

Most graduates of these programs go on to a family practice or a specialty residency which requires an additional 2-7 years of practical training. Completion of an internship or residency is a prerequisite for eligibility to practice medicine in Canada.

Exhibit II-5, opposite, summarizes the projected enrolments in medical programs and the number of graduates from each of the five universities. Further details are provided in a separate report entitled Physicians: The Scope of Existing Training Programs.

FUTURE TRAINING PROGRAMS

Chapter VI of this report presents the recommendations for training arising out of the projected net requirement for all physicians in Canada.

ALL PHYSICIANS

EXHIBIT III-1

CURRENT RATIOS OF GENERAL PRACTITIONERS TO SPECIALISTS

Province	Manpower Stock (1980) GP's	Specialists	Ratio of GP's : Specialists	Ratio of GP's : Population	Ratio of Specialists : Pop
British Columbia	2757	2280	55:45	1:950	1:1150
Alberta	1657	1241	57:43	1:1260	1:1680
Saskatchewan	773	534	59:41	1:1250	1:1810
Manitoba	950	742	55:45	1:1170	1:1410
TOTAL/OVERALL	6092	4797	56:44	1:1100	1:1400

Source:

Data based on information supplied by the College of Physicians and Surgeons of each province.

Persons listed on the educational registers are excluded.

III - PROPORTIONAL RELATIONSHIP OF GENERAL PRACTITIONERS TO SPECIALISTS

INTRODUCTION

Chapter II dealt with the question of how many physicians in total are required. This chapter examines the ratio of general practitioners/family physicians to specialists and suggests the appropriate ratio. Occupational issues that could affect the appropriate ratio are identified next. Some aspects of the methodology for determining manpower requirements are then explained (Appendix B provides further details on methodology).

The remainder of this chapter reviews the manpower requirement for:

- general practitioners/family physicians viewed as a single specialty group,
- all specialists viewed as a single group.

The purpose is to facilitate comparisons between these two major groups and to provide a comprehensive view of training requirements at the postgraduate (residency) level. Chapters IV and V deal with the individual medical and surgical specialties respectively.

CURRENT RATIOS

Exhibit III-1, opposite, shows the current ratios of general practitioners to specialists. The province with the highest number of general practitioners compared with specialists is Saskatchewan followed by Alberta, Manitoba and British Columbia. Analysis and discussions with physicians and others determined that the current situation closely reflects the appropriate balance of general practitioners to specialists and that the appropriate allocation of manpower to these two major streams should be:

EXHIBIT III-2

MANPOWER REQUIREMENTS FOR GENERAL PRACTITIONERS AND SPECIALISTS IN WESTERN CANADA

	British Columbia		Alberta		Sask.		Manitoba		Western Canada	
	GP's	Spec.	GP's	Spec.	GP's	Spec.	GP's	Spec.	GP's	Spec.
1980 Actual	2757	2280	1657	1241	773	534	905	742	6092	4797
Required	2289	1874	1817	1487	842	689	900	738	5848	4788
Net Required	-468	-406	160	246	69	155	-5	-4	-244	-9
1985 Projected	2852	2510	2022	1598	793	559	917	856	6584	5523
Required	2527	2069	2165	1772	903	739	950	777	6545	5358
Net Required	-325	-441	143	174	110	180	33	-78	-39	-165
1990 Projected	3071	2740	2447	1958	813	584	984	988	7315	6270
Required	2765	2263	2467	2020	965	790	981	803	7178	5876
Net Required	-306	-477	20	62	152	206	-3	-185	-137	-394
2000 Projected	3461	3206	3257	2678	823	634	1096	1270	8637	7788
Required	3167	2592	3041	2489	1072	877	1030	843	8310	6802
Net Required	-294	-613	-216	-189	249	243	-66	-427	-327	-986

Note:

GP's is the group of all General Practitioners and Family Physicians.

Spec. is the group of all Specialists.

Surpluses indicated by (-).

Calculations were based on the following service target ratios:

- GP's: Population 1:1146
- Specialists: Population 1:1400

- General Practice 55%,
- Medical/Surgical Specialty 45%.

This division is the most appropriate for the purposes of physician manpower planning in Western Canada. The needs of each province may vary from this guideline according to the influence of factors such as the accepted scope of practice of general practitioners and family physicians, and regional population density.

This ratio varies from that recommended by the the National Committee on Physician Manpower (1975). The ratio recommended in their report is 46:54. Members of the Committee have since emphasized that this ratio was intended to be a guideline only. Implementation of the Committee's recommendation would result in a reversal of the current situation in Western Canada and an increase in the number of specialists per general practitioner for Western Canada.

Exhibit III-2, opposite, shows the projected stocks and requirements for general practitioners and specialists during the period 1981-2000. This exhibit indicates that:

- o in Western Canada, from 1980 until the year 2000, the size of the surplus of general practitioners is projected to increase from approximately 250 to 325. The number of specialists in the western region is to increase from a balanced position to a surplus of approximately 1,000 certified specialists by the year 2000;

- o a majority of the net manpower surpluses projected for both general practitioners and specialists in western Canada for the year 2000 will be located in British Columbia where the 1980 manpower surplus for both of these groups was greater than 400 practitioners;

- Alberta will achieve a balanced position for practitioners in both the general practitioners' and specialists' group by the year 1990;

- in Saskatchewan, the requirement for additional practitioners in general practice and in the specialties is projected to increase from current levels to approximately 250 for each group by the year 2000;

- in Manitoba, the number of practitioners in the general practice group is projected to increase from a balanced position to a slight surplus by the year 2000 while a significant surplus of specialists will develop over the next 20 year period.

To develop the projected streams for these two major groups, the requirements identified in Exhibit II-3 in the preceding chapter were apportioned according to the ratio of 55:45 for general practitioners/family physicians to specialists.

For each province, the most likely scenario has been based on the median population projection and the service target ratio of 1:630 for all physicians. When apportioned to the two major streams of general practice and specialists, the service target ratios for each of these groups are 1:1146 and 1:1400 respectively.

OCCUPATIONAL ISSUES

There are many factors which may influence the appropriate ratio and thus the requirements for general practitioners/family physicians and specialists. Although the specific impact in quantitative terms is not easily identified, significant trends are discussed in the following sections.

Scope of Practice of Family Physicians

In recent years, an increasing number of physicians wishing to serve in general or family practice have elected the two year family practice programs offered by each of the five Western Canadian medical schools. (Alberta currently requires that graduates complete a two-year general or family practice residency or internship program prior to practicing in this field. A similar requirement should be considered by the other Western provinces).

It is appropriate to allow licensed family practitioners to conduct many of the procedures which they, as well as specialists, are trained to perform. (Examples of such procedures are simple deliveries, simple reductions and lumbar punctures.) In the future, it is reasonable to expect that family physicians will continue to provide the majority of first contact health care services as well as perform "complicated" procedures.

Approach to Medical Services

It would appear that qualified family physicians are to continue as the point of initial contact for patients. Referrals to specialists should continue to be made as appropriate by family physicians. This would suggest that the current balance between family physicians and specialists should be maintained.

Cost of Medical Services

The reimbursement that specialists receive is proportionately higher than that received by general practitioners/family physicians. It can therefore be expected that the cost of medical services will rise if the proportion of specialists increases in relation to the proportion of family physicians.

GENERAL AND PROVINCIAL ASSUMPTIONS

The assumptions which have been made for general practitioners/family physicians, for all specialists as a group, and for each of the specialties, are identified in the discussion of each of these groups in this chapter and the two subsequent chapters. Appendix B provides further detail on the overall provincial and net manpower requirements.

METHODOLOGY FOR DETERMINING MANPOWER REQUIREMENTS FOR THE SPECIALTIES

Two analytical approaches have been utilized to determine the number of physicians required in each specialty group. For those groups of active Physicians sufficiently large in number in each province to permit trends to be identified, the various factors affecting supply and demand were assessed to project the training requirements to the year 2000. Major specialty groupings to which this analysis was applied include:

- General Practice/Family Medicine,
- All Specialists (viewed as a single group),
- Internal Medicine,
- Anaesthesia,
- Diagnostic Radiology,
- Paediatrics,
- Psychiatry,
- Laboratory Specialists,
- General Surgery,
- Obstetrics and Gynecology,
- Ophthalmology,
- Orthopaedic Surgery.

For the remaining specialties, in which the number of practitioners currently active is insufficient to identify meaningful supply or demand trends, the

current net manpower requirements and the future requirements were calculated on the basis of service target ratios.

As noted earlier in this chapter, the ratio of general practitioners to specialists used to project physician manpower requirements differs from the requirements identified by the National Committee on Physician Manpower (1975). However, the service target ratios that the Committee identified for each of the specialty groups provided useful guidelines for the projection of future manpower needs and were therefore used as a starting point. The ratios for each of the specialty groups were then adjusted to reflect the desirable ratio (55:45) between general practitioners and specialists required for Western Canada. This adjustment has been reviewed and deemed appropriate by members of the Committee.

Ratios Adjusted

The upward adjustment of the general practice service target ratio from 1:1440 to 1:1146 was noted earlier in this chapter. To ensure that the service target ratio for each specialty reflects the downward adjustment for all specialists (from 1:1170 to 1:1400), the population to be served by each specialist was increased by 20%. This increase resulted in a significant variance from the recommendations of the National Committee on Physician Manpower. Therefore, the manpower requirements which result from the application of the Committee's unadjusted service target ratios are identified in the notes appearing on the Exhibits showing the manpower requirements for each major specialty. (These Exhibits appear in the body of the remainder of this chapter and in Chapters IV and V).

The methods used to determine projected supply and requirements are summarized in Chapter II and discussed in detail in Appendix B.

PHYSICIAN CATEGORIES

In order to specify training requirements as comprehensively as possible, physicians have been divided into two major categories:

- general practitioners and family physicians who require a 1-2 year internship subsequent to completing medical school,

- specialists who must complete a 4-7 year residency program following medical school in order to be certified in their chosen specialty.

The Royal College of Physicians and Surgeons of Canada will offer examinations leading to certification in 39 specialties within medicine in 1983. There are two major Divisions within the College: the Division of Medicine and the Division of Surgery. The Division of Medicine is subdivided into clinical and laboratory specialties. (The specialties within each Division are reviewed individually in Chapters IV and V of this report to determine their manpower training requirements).

The remainder of this chapter examines the requirements for general practitioners and for all specialists within the 39 recognized specialties viewed as a single group.

EXHIBIT III-3

TOTAL NUMBER OF GENERAL PRACTITIONERS IN WESTERN CANADA

Year	British Columbia[1]	Alberta[2]	Saskatchewan[3]	Manitoba[4]	Total
1979	2630	1567	745	887	5829
1980	2757	1657	773	905	6092

Sources:

1. Roll Call 79, Roll Call Update 80. Report data obtained from College of Physicians and Surgeons of British Columbia.

2. Alberta Physician Data Bank: Health and Social Services Manpower in Alberta. Report data obtained from the College of Physicians and Surgeons of Alberta.

3. Saskatchewan Medical Association Monthly Report: Physicians in Saskatchewan by Field of Practice, by Method of Payment.

4. Health Manpower Provincial Report 1980. Report data obtained from the College of Physicians and Surgeons of Manitoba.

GENERAL PRACTITIONERS

General practitioners and family physicians are trained to provide primary medical care.

Upon completion of medical school, graduates must satisfactorily complete a one-year rotating internship program. In Alberta a two-year internship is required, with the first rotating year being followed by a second year in one or two specialties.

The two-year family medicine residency provides a formal training program covering the primary care disciplines. Upon completion of the two-year program, residents may write the family practice examination offered by the College of Family Physicians of Canada. Although it is not necessary for a resident to pass the examination to practice, many hospitals require this qualification as a condition of receiving hospital privileges.

All non-certified specialists (i.e., physicians who have completed a residency training program but who have not passed the College examinations) are also included within the general practice category.

Manpower Stock

Exhibit III-3, opposite, shows that there are a total of approximately 6,000 general practitioners and family physicians in Western Canada who are active in their respective provinces as identified by the sources noted on the Exhibit. Almost 50% of these are resident in British Columbia.

Exhibit III-4, overleaf, shows the current age distribution of general practitioners.

EXHIBIT III-4

AGE DISTRIBUTION OF GENERAL PRACTITIONERS

AGE GROUP	BRITISH COLUMBIA		ALBERTA		SASKATCHEWAN		MANITOBA		REGION	
	#	%	#	%	#	%	#	%	#	%
20 - 24	219	7.9	-	-	67	8.7	-	-	286	4.7
25 - 29	220	8.0	168	10.1	68	8.8	131	13.8	587	9.6
30 - 34	572	20.8	331	20.0	68	8.8	186	19.6	1157	18.9
35 - 39	572	20.8	268	16.2	110	14.2	116	12.2	1066	17.4
40 - 44	252	9.1	170	10.3	110	14.2	92	9.7	624	10.2
45 - 49	252	9.1	176	10.6	95	12.3	86	9.1	609	9.9
50 - 54	208	7.5	176	10.6	96	12.4	109	11.5	589	9.6
55 - 59	208	7.5	155	9.4	60	7.8	86	9.1	509	8.3
60 - 64	96	3.6	115	6.9	61	7.9	62	6.6	334	5.4
65 +	158	5.7	98	5.9	38	4.9	80	8.4	374	6.0
UNKNOWN										
TOTAL	2757	100%	1657	100%	773	100%	948	100%	6135	100%
POP. RATIO	2,647,000 1:951		2,082,200 1:1257		976,970 1:1248		1,054,400 1:1651		6,787,570 1:1037	

Service Target Ratio: 1:1146

Notes:

Variances may occur in numbers of physicians reported in "age distribution" and "total numbers" tables as information may have been obtained from data sources reflecting the situation at differing points in time. The source and time of data collection is indicated below for each province:

British Columbia: Health Services Research and Development, U.B.C., July 1, 1981.

Alberta: College of Physicians and Surgeons of Alberta, May 31, 1981.

Saskatchewan: College of Physicians and Surgeons of Saskatchewan, Sept. 1, 1981.

Manitoba: College of Physicians and Surgeons of Manitoba, July 1, 1981.

Factors Affecting Manpower Supply

The assumptions made with respect to each of the factors which affect manpower stock are shown in Exhibit III-5, overleaf, and discussed below.

Calculation of Requirements

In order to estimate net manpower requirements, three ratios were applied to the data to arrive at the figures shown in Exhibit III-6.

Historical Ratio

The current ratio of general practitioners to population was used to project the number of general practitioners required in the future to maintain the current levels of manpower. The current ratio for each of the provinces is as follows:

British Columbia	1: 951
Alberta	1:1257
Saskatchewan	1:1248
Manitoba	1:1651
Western Canada	1:1037

Utilization

Data defining the practice patterns of general practitioners by age and sex of patients in each of the provinces was used to project future utilization. Details of the methodology employed for this approach are provided in Appendix B.

EXHIBIT III-5

FACTORS AFFECTING MANPOWER SUPPLY
GENERAL PRACTITIONERS/FAMILY PHYSICIANS, WESTERN CANADA

FACTOR	ASSUMPTIONS BY PROVINCE			
	British Columbia	Alberta	Saskatchewan	Manitoba
Opening Stock (1980)	2757	1657	773	905
Net Migration	31	20	-20	-20
Net Immigration	-8	10	9	17
Net Occupational Shift	-28	-22	-7	-8
Training Output	74	108	38	41.7
Attrition	Current age distribution and assumed retirement at age 65.	See B.C.	See B.C.	See B.C.

Notes:

Opening Stock:

See notes on Exhibit III-3.

Net Migration:

British Columbia, Saskatchewan, Manitoba:

Interprovincial Migration of Physicians Reports (1978-80) prepared by Health and Welfare Canada based on data obtained from S.M.S. tapes. Separate reporting on General Practitioners and Family Physicians provides accurate data on historical trends.

Alberta:

Accurate information on those physicians involved in fee-for-service activities obtained from Physician Data Base (1978-80).

EXHIBIT III-5, continued

Net Immigration:

British Columbia, Saskatchewan, Manitoba:

Immigration information on General Practice obtained from Immigration Tables by Specialty (1978-80) prepared by Health and Welfare Canada, based on data obtained from S.M.S. tapes. Emigration information on General Practitioners obtained from Active Physicians who Moved Abroad (1978-80) prepared by Health and Welfare Canada based on S.M.S. data. Separate reporting on General Practice provides accurate information on historical trends.

Alberta:

Accurate information obtained from Physician Data Base (1978-80).

Net Occupational Shift:

Data suggests shifts within medical specialties are insignificant.

Training Output:

Based on the projected enrolment of each of the 5 medical schools less a factor for attrition and less the number of positions available in residency programs. This figure was then adjusted by the amount of the net shift to allow the projections for all general practitioners and for all specialists to coincide with all physicians.

General Comment:

The projections for net migration and immigration were based on the experience of the past three years. As these figures often varied widely and as no distinct trends could be identified, the figures which were input for the projections should be viewed with caution.

EXHIBIT III-6

NET MANPOWER REQUIREMENTS
GENERAL PRACTICE/FAMILY MEDICINE

	British Columbia			Alberta			Saskatchewan			Manitoba			Total		
	Hist. Ratio	Util.	Serv. Tar.	Hist. Ratio	Util.	Serv. Tar.	Hist. Ratio	Util.	Serv. Tar.	Hist. Ratio	Util.	Serv. Tar.	Hist. Ratio	Util.	Serv. Tar.
1981															
Required	2810	2814	2333	1715	1716	1880	783	784	853	911	913	927	6219	6227	5993
Net	47	51	-430	-15	-14	150	6	7	76	3	5	19	41	49	-185
1985															
Required	3044	3063	2527	1975	1971	2065	829	835	903	935	938	950	6783	6807	6545
Net	192	211	-325	-47	-51	143	36	42	110	18	21	33	199	223	-39
1990															
Required	3330	3364	2765	2250	2237	2467	886	893	965	959	967	981	7425	7461	7178
Net	259	293	-306	-197	-210	20	73	80	152	-19	-17	-3	116	146	-137
2000															
Required	3815	3871	3167	2773	2762	3041	984	985	1072	1013	1005	1096	8585	8623	8310
Net	354	410	-294	-484	-495	-216	161	162	249	-83	-91	-66	-52	-14	-327

Notes:

Net manpower requirements for general practitioners based on the service target ratio of 1:1440 as recommended by the National Committee on Physician Manpower are as follows:

	B.C.	Alta.	Sask.	Man.	Total
1981	-906	-234	-99	-174	-1413
1985	-841	-299	-74	-161	-1375
1990	-565	-483	-45	-203	-1296
2000	-940	-837	-30	-297	-2104

Notes: Surpluses are indicated by (-)

Service Target Ratio

A service target ratio of 1:1146 was used, based on the optimal ratio of general practitioners and family physicians to specialists, i.e., 55:45. This allocation was then applied to the service target ratio for all physicians (1:630) to obtain the service target of 1:1146.

It should be noted that the National Committee on Physician Manpower (1975) recommended a service target ratio of 1:1440 for all general practitioners and family physicians. The Committee also suggested that a ratio of 1 full-time general practitioner to 2300 people is required to provide the fee-for-service component of medical care.

The Committee found that 36% of general practitioners were not involved in full-time fee-for-service practices. This pattern has been assumed to be stable.

Net Manpower Requirements

The net manpower requirements indicated in Exhibit III-6, opposite, suggest that a surplus of general practitioners and family physicians currently exists in Western Canada based on the service target ratio of 1:1146. British Columbia has a large surplus (approximately 400) which is projected to increase in size. Alberta is reducing its requirement and is projected to achieve a balanced situation shortly after 1990. The relative size of the requirement in Saskatchewan is expected to increase from 76 to 249 over the forecast period. Manitoba is projected to achieve a balanced position by 1990.

In the four provinces as a whole, the service target ratio method indicates a current surplus of 185 increasing to 327 by the year 2000. This varies

significantly from the 1975 National Committee report which identifies a surplus of 1,400 increasing to 2,100 by the year 2000.

Occupational Issues

In considering these projected requirements, it is important to take into account the numerous factors which affect manpower requirements. Specific factors which may influence the requirements for general practitioners are as follows:

- The number of medical school graduates selecting the two-year family practice program rather than the one-year general practice internship is increasing. The level of primary care offered to patients is thus likely to improve. If the provincial health care programs support the role of the family practitioner and discourage specialists from providing primary care, additional family physicians may be required;

- The role of the family physician will likely continue to evolve. The degree to which family physicians will be involved in caring for specific groups such as the elderly and the young in the future is not clear.

EXHIBIT III-7

TOTAL NUMBER OF SPECIALISTS IN WESTERN CANADA

Year	British Columbia[1]	Alberta[2]	Saskatchewan[3]	Manitoba[4]	Total
1979	-	1192	528	725	-
1980	2280	1241	534	742	4797

Notes:

[1] Roll Call 79, Roll Call Update 80. Report data obtained from College of Physicians and Surgeons of British Columbia.

[2] Alberta Physician Data Bank: Health and Social Services Manpower in Alberta. Report data obtained from the College of Physicians and Surgeons of Alberta.

[3] Saskatchewan Medical Association Monthly Report: Physicians in Saskatchewan by Field of Practice, by Method of Payment.

[4] Health Manpower Provincial Report 1980. Report data obtained from the College of Physicians and Surgeons of Manitoba.

ALL SPECIALISTS

The manpower requirements for the 39 specialties recognized by the Royal College of Physicians and Surgeons of Canada are examined in this section. The specialties are treated here as a single group.

Manpower Stock

Exhibit III-7, opposite, shows that there are a total of some 4,800 certified specialists in Western Canada identified as active in their respective provinces by the sources noted on the Exhibit. Some 50% of these specialists are located in the province of British Columbia.

Factors Affecting Manpower Supply

The assumptions made with respect to each of the factors which could affect manpower stock are shown in Exhibit III-8, overleaf.

Calculation of Requirements

In order to estimate net manpower requirements, two ratios were applied to the data in order to arrive at the figures shown in Exhibit III-9.

Historical Ratio

The current ratios of specialists to population were used to project the number of specialists required in the future to maintain the current levels of manpower. The current ratio for each of the provinces is as follows:

EXHIBIT III-8

FACTORS AFFECTING MANPOWER SUPPLY
SPECIALISTS, WESTERN CANADA

FACTOR	ASSUMPTIONS BY PROVINCE			
	British Columbia	Alberta	Saskatchewan	Manitoba
Opening Stock	2280	1241	534	742
Net Migration	49	10	-5	-5
Net Immigration	0	5	-4	-2
Net Occupational Shift	0	0	0	0
Training Output	77	109 (ave.)	28.7	70.3
Attrition	Current age distribution and assumed retirement at age 65.	See B.C.	See B.C.	See B.C.

NOTES:

Opening Stock:

See notes on Exhibit III-6.

Net Migration:

British Columbia, Saskatchewan, Manitoba:

Interprovincial Migration of Physicians Reports (1978-80) prepared by Health and Welfare Canada based on data obtained from S.M.S. tapes. As all specialists are reported separately as a group it was possible to obtain accurate information on historical emigration.

Alberta:

Accurate information obtained from Physician Data Base (1978-80).

EXHIBIT III-8, continued

Net Immigration:

British Columbia, Saskatchewan, Manitoba:

Immigration information on Specialists obtained from Immigration Tables by Specialty (1978-80) prepared by Health and Welfare Canada, based on data obtained from S.M.S. tapes. Emigration information on all specialists obtained from Active Physicians who Moved Abroad (1978-80) prepared by Health and Welfare Canada based on S.M.S. data. Both data sources provide accurate information on the historical movement of all specialists.

Alberta:

Accurate information obtained from Physician Data Base (1978-80).

Net Occupational Shift:

Data suggests shifts from medical specialties are insignificant.

Training Output:

Based on the current theoretical output of residents from each of the 5 medical schools. Data was obtained and confirmed by the Assistant Dean of Postgraduate Medicine of each school. The projections assume that all residents receive certification and initiate practice in the province where they received training. It is known that migration and emigration does occur following graduation but in the absence of available data defining these movements this assumption is necessary. It can be assumed that in and out migration will counterbalance one another to a degree.

Attrition:

Based on data obtained from the respective Colleges of Physicians and Surgeons of each province.

EXHIBIT III-9

NET MANPOWER REQUIREMENTS ALL SPECIALISTS

	British Columbia		Alberta		Saskatchewan		Manitoba		Total	
	Hist. Ratio	Serv. Tar.	Hist. Ratio	Serv. Tar.	Hist. Ratio	Serv. Tar.	Hist. Ratio	Serv. Tar.	Hist. Ratio	Serv. Tar.
1981										
Required	2324	1910	1284	1539	541	698	747	758	4896	4905
Net	-16	-536	-44	212	3	160	-33	-22	-90	-186
1985										
Required	2517	2069	1479	1772	573	739	766	778	5335	5358
Net	-61	-625	-197	96	19	185	-165	-153	-404	497
1990										
Required	2754	2263	1685	2020	612	790	791	803	5842	5876
Net	-119	-716	-426	-91	38	216	-344	-332	-851	-923
2000										
Required	3155	2593	2077	2489	680	877	830	843	6742	6802
Net	-314	-1020	-899	-487	72	269	-727	-714	-1868	-1952

Notes:

Net Manpower requirements for all Specialists based on the service target ratios of 1:1120 as recommended for all specialties reviewed by the National Committee on Physician Manpower are as follows:

	B.C.	Alta.	Sask.	Man.	Total
1981	47	596	334	168	1145
1985	8	540	370	41	959
1990	-44	414	414	-131	653
2000	-228	135	489	-503	-107

Surpluses are indicated by (-)

British Columbia	1:1150
Alberta	1:1700
Saskatchewan	1:1800
Manitoba	1:1400
Western Canada	1:1400

Service Target Ratio

A service target ratio of 1:1400 was used based on the optimal ratio of general practitioners and family physicians to specialists, i.e., 55:45. This allocation was applied to the service target ratio for all physicians (1:630) to obtain the service target of 1:1440 for all specialists.

It should be noted that the National Committee on Physician Manpower reviewed a majority of the 39 specialties assessed in this report. Their recommendations suggest a service target ratio of 1:1120.

Net Manpower Requirements

The net manpower requirements indicated in Exhibit III-9, opposite, suggest that surpluses of certified specialists currently exist in British Columbia and, to a lesser extent, in Manitoba based on the service target ratio of 1:1400. By the year 2000, all of the western provinces will have developed significant surpluses of specialists with the exception of Saskatchewan where the current requirement will increase.

MEDICAL SPECIALTIES

IV - MEDICAL SPECIALTIES

The Royal College of Physicians and Surgeons of Canada groups the specialty examinations it conducts into two divisions: the Division of Medicine and the Division of Surgery. The Division of Medicine is subdivided into Clinical and Laboratory specialties and there are 21 Clinical Specialties within the Division of Medicine as follows:

- Internal Medicine,
  - . Clinical Immunology (and Allergy),
  - . Cardiology,
  - . Gastroenterology,
  - . Haematology,
  - . Nephrology*,
  - . Respiratory Medicine,
  - . Rheumatology,
- Anaesthesia,
- Community Medicine,
- Dermatology,
- Diagnostic Radiology,
- Emergency Medicine*,
- Geriatric Medicine,
- Infectious Diseases*,
- Neurology,
- Nuclear Medicine,
- Paediatrics,
- Physical Medicine and Rehabilitation,
- Psychiatry,
- Radiation Oncology.

* indicates specialties for which examinations are to be developed by 1983.

The 6 Laboratory Specialties in the Division of Medicine encompass the following:

- General Pathology,
- Anatomical Pathology,
- Neuropathology,
- Hematological Pathology,
- Medical Biochemistry,
- Medical Microbiology.

For analytical purposes, Internal Medicine and its subspecialties listed above are treated as a single group, as are all the Laboratory Specialties. Analyses of the manpower requirements for both the clinical and laboratory medical specialties are set out in this section of the report.

INTERNAL MEDICINE

Because discrete data on each of the disciplines which comprise Internal Medicine is not available, General Internal Medicine has been grouped with the sub-specialties of Clinical Immunology, Cardiology, Gastroenterology, Haematology, Nephrology*, Respiratory Medicine, and Rheumatology for the purposes of this analysis.

Definitions

Specialists of Internal Medicine or internists are concerned with diseases and disorders of the internal structures of the adult human body. Subspecialties of Internal Medicine include:

- Cardiologists are concerned with problems related to the cardiovascular system,
- Gastroenterologists are concerned with problems arising from diseases mainifesting themselves in the gastro-intestinal tract,
- Hematologists are concerned with diseases manifesting abnormalities in the blood and hematopoietic system,
- Respirologists are concerned with disorders of the respiratory system,
- Rheumatologists are concerned with arthritic and rheumatic diseases,

* An examination is to be developed for this specialty in 1983.

EXHIBIT IV-1

TOTAL NUMBER OF INTERNISTS IN WESTERN CANADA

Year	British Columbia[1]	Alberta[2]	Saskatchewan[3]	Manitoba[4]	Total Region
1979	329	209	86	145	769
1980	342	216	87	150	795

Notes:

1. Roll Call 79, Roll Call Update 80. Report data obtained from College of Physicians and Surgeons of British Columbia.

2. Alberta Physician Data Bank: Health and Social Services Manpower in Alberta. Report data obtained from the College of Physicians and Surgeons of Alberta.

3. Saskatchewan Medical Association Monthly Report: Physicians in Saskatchewan by Field of Practice, by Method of Payment.

4. Health Manpower Provincial Report 1980. Report data obtained from the College of Physicians and Surgeons of Manitoba.

- Nephrologists are concerned with renal diseases and dysfunctions,

- Allergists and Clinical Immunologists are concerned with certain diseases resulting from or associated with inappropriate immune responses.

Manpower Stock

Exhibit IV-1, opposite, shows that there are a total of 795 certified Internists in Western Canada who are active in their respective provinces as identified by the sources noted on the Exhibit. Exhibit IV-2, overleaf, shows the current age distribution of Internists and the following key features should be noted:

Factors Affecting Manpower Supply

The assumptions made with respect to each of the factors which could affect manpower stock are shown in Exhibit IV-3, overleaf.

Calculation of Requirements

In order to estimate net manpower requirements, three ratios were applied to the data to arrive at the figures shown in Exhibit IV-4.

Historical Ratio

The current ratios of Internal Medicine specialists to population were used to project the number of specialists required in this discipline in the future to

EXHIBIT IV-2

AGE DISTRIBUTION OF INTERNAL MEDICINE SPECIALISTS

AGE GROUP	BRITISH COLUMBIA		ALBERTA		SASKATCHEWAN		MANITOBA		REGION	
	#	%	#	%	#	%	#	%	#	%
20 - 24	1	0.3	-	-	5	5.8	-	-	6	0.7
25 - 29	2	0.6	-	-	5	5.8	-	-	7	0.9
30 - 34	38	11.1	41	18.0	5	5.8	17	11.1	101	12.5
35 - 39	39	11.5	43	18.9	15	17.2	26	17.0	123	15.2
40 - 44	50	14.6	42	18.4	16	18.4	18	11.8	126	15.5
45 - 49	50	14.6	28	12.3	15	17.2	30	19.6	123	15.2
50 - 54	47	13.7	20	8.8	15	17.2	12	7.8	94	11.6
55 - 59	47	13.7	17	7.5	3	3.4	21	13.7	88	10.9
60 - 64	27	7.9	23	10.0	3	3.4	15	9.8	68	8.4
65 +	41	12.0	14	6.1	5	5.8	14	9.2	74	9.1
UNKNOWN										
TOTAL	342	100%	228	100%	87	100%	153	100%	810	100%
POP. RATIO	2,647,000 1:7,670		2,082,200 1:9,640		976,970 1:11,100		1,054,400 1:7,030		6,787,570 1:8,640	

Service Target Ratio: 1:9,540

See Exhibit III-4 for sources and explanatory notes.

EXHIBIT IV-3

FACTORS AFFECTING MANPOWER SUPPLY
INTERNAL MEDICINE SPECIALISTS, WESTERN CANADA

FACTOR	ASSUMPTIONS BY PROVINCE			
	British Columbia	Alberta	Saskatchewan	Manitoba
Opening Stock (1980)	342	216	87	150
Net Migration	6	4	0	-2
Net Immigration	-3	1	0	-1
Net Occupational Shift	0	0	0	0
Training Output	15	25	5.25	19.5
Attrition	Current age distribution and assumed retirement at age 65.	See B.C.	See B.C.	See B.C.

Notes:

Opening Stock: See notes on Exhibit IV-1.

Factors: See notes in Appendix A.

maintain the current level of manpower. The current ratio for each of the provinces is as follows:

British Columbia	1: 7,670
Alberta	1: 9,640
Saskatchewan	1:11,100
Manitoba	1: 7,030
Western Canada	1: 8,640

Utilization

Data defining the practice patterns of Internists by age and sex of patients in each of the provinces was used to project future utilization. Details of the methodology employed in this approach are provided in Appendix B.

Service Target Ratio

A service target ratio of 1:9,540 was used for internal medicine. This ratio was developed through adjustment of the median of the guidelines recommended by the National Committee on Physician Manpower (1975).

The Working Party and the Requirements Committee of the National Committee recommended differing ratios for Internal Medicine specialists. The Working Party suggested that the 1981 requirement for Internal Medicine specialists would be 1:7,700. The Requirements Committee suggested a ratio of 1:8,200 as appropriate for planning purposes in 1975. These recommendations were based on the following assumptions:

- in 1975 it was determined that 68% of active internal medicine specialists were full time fee-for-service physicians (active Internists billing over $20,000 in 1975). It was assumed that this trend would continue in the future,

- administrative teaching and research duties would occupy 10% of active specialists.

The National Committee on Physician Manpower (1975) also developed specific service target ratios for the subspecialties within Internal Medicine. These requirements were to be subtracted from the 1:8,200 ratio for the Internal Medicine specialties to obtain an appropriate ratio for certified physicians in Internal Medicine who would train as generalists rather than pursuing subspecialty training.

The requirements identified by the National Committee for subspecialists are as follows:

Allergists	1:100,000
Clinical Immunologists	1:365,000
Cardiologists	1: 35,000(a)
Gastroenterologists	1:100,000
Haematologists	1: 65,000
Nephrologists	1:166,000(b)
Respirologists	1: 78,600(c)
Rheumatologists	1:150,000
All Internal Medicine Subspecialists	1: 10,900

(a) The National Committee was unable to develop an appropriate service target ratio for Cardiology due to the absence of data. The ratio of 1:35,000 was proposed on the basis of information from Quebec where 38% of Internists are Cardiologists.

(b) The National Committee did not review requirements for Nephrologists. This ratio was calculated on the basis of experience cited in the Report on Nephrology Manpower submitted to the Canadian Society of Nephrology, in September, 1981.

(c) The National Committee on Physician Manpower (1975) report stated that "neither demand nor perceived need were as great as true need and that utilization would under-represent true need by at least 30%" (v.II, p.61). This factor was applied to the requirements to derive the service target ratio of 1:78,600.

EXHIBIT IV-4

NET MANPOWER REQUIREMENTS
INTERNAL MEDICINE SPECIALISTS

	British Columbia			Alberta			Saskatchewan			Manitoba			Total		
	Hist. Ratio	Util.	Serv. Tar.	Hist. Ratio	Util.	Serv. Tar.	Hist. Ratio	Util.	Serv. Tar.	Hist. Ratio	Util.	Serv. Tar.	Hist. Ratio	Util.	Serv. Tar.
1981															
Required	349	349	280	224	223	226	88	88	102	151	152	111	812	812	719
Net	1	1	-68	-14	-15	-12	-3	-3	11	-9	-8	-49	-25	-25	-118
1985															
Required	378	378	304	257	254	260	93	94	109	155	159	114	883	885	787
Net	9	9	-65	-72	-75	-69	-20	-19	-4	-48	-44	-89	-131	-129	-227
1990															
Required	413	421	332	293	292	296	100	101	116	160	167	118	966	981	862
Net	-3	5	-84	-170	-171	-167	-43	-42	-27	-105	-98	-147	-321	-306	-425
2000															
Required	473	522	380	362	385	365	111	115	129	168	183	124	1114	1205	998
Net	-36	13	-129	-352	-329	-349	-70	-66	-52	-220	-205	-264	-678	-587	-794

Notes:

Net Manpower requirements for Internists based on the service target ratios ranging from 1:8,200 to 1:7,700 as recommended by the National Committee on Physician Manpower are as follows:

	B.C.	Alta.	Sask.	Man.	Total
1981	-22to -1	25 to 42	27to37	-22 to -13	8 to 65
1985	-16to 7	-26 to -6	20to28	-71 to -62	-93 to -33
1990	-30to -5	-151to-129	7 to16	-128to-119	-302to-237
2000	-66to-37	-289to-269	-1 to 9	-244to-235	-600to 532

Surpluses are indicated by (-)

The service target for Internists who do not pursue a subspecialty would therefore be 1:18,100 derived from the service target ratio of 1:7,700 developed by the National Committee on Physician Manpower (1975).

Adjustment of these subspecialty ratios to correspond with the desirable balance between General Practitioners and Specialists would result in the following service target ratios:

Allergists	1:120,000
Clinical Immunologists	1:438,000
Cardiologists	1: 42,000
Gastroenterologists	1:120,000
Haematologists	1: 78,000
Nephrologists	1:166,000
Respirologists	1: 94,300
Rheumatologists	1:180,000
All Internal Medicine Subspecialists	1: 13,100
Internal Medicine Generalists	1: 22,000

A readjustment of these guidelines in favour of generalists may be desirable since the ratios identified above could cause insufficient Internists who do not pursue a specialty to be produced.

Net Manpower Requirements

The net manpower requirements for Internal Medicine specialists are identified in Exhibit IV-4, opposite. Based on the service target ratio of 1:9,540, each of the Western provinces has a surplus of Internists. The surplus is largest in British Columbia and Manitoba.

Occupational Issues

Specific factors which may influence the requirements for Internal Medicine specialists are as follows:

- Currently, the proportion of physicians within the Internal Medicine group who pursue subspecialty training is increasing relative to those who elect a general Internal Medicine training and practice. This trend can be expected to continue as the establishment of subspecialty practices in Internal Medicine becomes the accepted pattern of service delivery in urban areas. However, there will likely be an ongoing requirement for a certain number of Internal Medicine generalists to service less densely populated areas;

- The requirement for Internists to treat the elderly segment of our aging population will be affected by the development of the specialty of Geriatric Medicine. If the projected oversupply of Internists continues to develop, these specialists are likely to assume the role of treating the elderly;

- With respect to the subspecialties of Allergy and Clinical Immunology, the National Committee on Physician Manpower suggested a ratio of 3.5:1 Allergists to Clinical Immunologists. The national ratio at the time of the study was 1.6:1. Therefore the Committee recommended that relatively more Allergists be trained;

- The incidence of allergy-related ailments may not be evenly distributed throughout Canada. The need for these specialists in Western Canada may differ from national requirements;

- The Requirements Committee of the National Committee on Physician Manpower did not support the recommendations of the Working Party dealing with the subspecialty of Rheumatology. The latter had suggested an immediate 45% increase in the number of Rheumatologists. The Requirements Committee felt that "with the geographical realities of Canada and the fact that many rheumatic patients require frequent visits over long periods of time, it may be that optimal delivery of care would result from improving the expertise of general internists and general physicians in this field rather than attempting to ensure that every citizen with rheumatic disease has easy access to a rheumatologist" (v.II, p.72).

EXHIBIT IV-5

TOTAL NUMBER OF ANAESTHETISTS IN WESTERN CANADA

Year	British Columbia[1]	Alberta[2]	Saskatchewan[3]	Manitoba[4]	Total
1979	215	105	28	51	399
1980	226	115	32	50	423

Sources:

1 Roll Call 79, Roll Call Update 80. Report data obtained from College of Physicians and Surgeons of British Columbia.

2 Alberta Physician Data Bank: Health and Social Services Manpower in Alberta. Report data obtained from the College of Physicians and Surgeons of Alberta.

3 Saskatchewan Medical Association Monthly Report: Physicians in Saskatchewan by Field of Practice, by Method of Payment.

4 Health Manpower Provincial Report 1980. Report data obtained from the College of Physicians and Surgeons of Manitoba.

ANAESTHESIA

Specialists in Anaesthesia are concerned with the prevention of pain and with life support during surgical intervention and resuscitation.

Manpower Stock

Exhibit IV-5, opposite, shows the total number of certified Anaesthetists in Western Canada who are active in their respective provinces as identified by the sources noted on the Exhibit. Exhibit IV-6, overleaf, shows the current age distribution of Anaesthetists.

Factors Affecting Manpower Supply

The assumptions made with respect to each of the factors which could affect manpower stock are shown in Exhibit IV-7, overleaf.

Calculation of Requirements

In order to estimate net manpower requirements, three ratios were applied to the data to arrive at the figures shown in Exhibit IV-8.

Historical Ratio

The current ratios of Anaesthetists to population were used to project the number of Anaesthetists required in the future to maintain the current levels of manpower. The current ratio for each of the provinces is as follows:

British Columbia	1:11,500
Alberta	1:18,000

EXHIBIT IV-6

AGE DISTRIBUTION OF ANAESTHETISTS

AGE GROUP	BRITISH COLUMBIA		ALBERTA		SASKATCHEWAN		MANITOBA		REGION	
	#	%	#	%	#	%	#	%	#	%
20 - 24	-	-	-	-	1	3.1	-	-	1	0.2
25 - 29	1	0.4	1	0.9	1	3.1	-	-	3	0.7
30 - 34	27	11.9	9	7.7	1	3.1	6	11.3	43	10.0
35 - 39	27	11.9	14	12.0	4	12.6	9	17.1	54	12.6
40 - 44	34	15.0	14	12.0	5	15.6	6	11.3	59	13.8
45 - 49	34	15.0	20	17.1	5	15.6	8	15.1	67	15.7
50 - 54	32	14.2	22	18.8	5	15.6	4	7.5	63	14.7
55 - 59	31	13.9	20	17.0	4	12.6	15	28.3	70	16.4
60 - 64	18	8.0	8	6.8	4	12.6	4	7.5	34	7.9
65 +	22	9.7	9	7.7	2	6.1	1	1.9	34	7.9
UNKNOWN										
TOTAL	226	100%	117	100%	32	100%	53	100%	428	100%
POP. RATIO	2,647,000 1:11,500		2,082,200 1:18,000		976,970 1:30,000		1,054,400 1:21,000		6,787,570 1:16,000	

Service Target Ratio: 1:16,500

See Exhibit III-4 for sources and explanatory notes.

EXHIBIT IV-7

FACTORS AFFECTING MANPOWER SUPPLY
ANAESTHETISTS, WESTERN CANADA

FACTOR	ASSUMPTIONS BY PROVINCE			
	British Columbia	Alberta	Saskatchewan	Manitoba
Opening Stock	226	115	32	50
Net Migration	5	1	2	-2
Net Immigration	0	0	0	0
Net Occupational Shift	0	0	0	0
Training Output	8.7	7.3	3	6
Attrition	Current age distribution and assumed retirement at age 65.	See B.C.	See B.C.	See B.C.

Notes:

Opening Stock: See notes on Exhibit IV-5.

Factors: See notes in Appendix A.

EXHIBIT IV-8

NET MANPOWER REQUIREMENTS
ANAESTHESIA

	British Columbia			Alberta			Saskatchewan			Manitoba			Total		
	Hist. Ratio	Util.	Serv. Tar.	Hist. Ratio	Util.	Serv. Tar.	Hist. Ratio	Util.	Serv. Tar.	Hist. Ratio	Util.	Serv. Tar.	Hist. Ratio	Util.	Serv. Tar.
1981															
Required	230	231	162	119	119	131	32	32	59	50	51	64	431	433	416
Net	-2	-1	-70	-1	-1	11	-4	-4	23	-3	-2	11	-10	-8	-25
1985															
Required	250	251	176	137	137	150	33	29	63	52	52	66	473	473	455
Net	-5	-4	-79	-3	-3	10	-18	-19	11	-13	-13	1	-39	-39	-57
1990															
Required	273	276	192	156	156	171	37	34	67	53	54	68	519	520	498
Net	-15	-12	-96	-7	-7	8	-35	-38	-5	-17	-16	-2	-74	-73	-95
2000															
Required	313	322	220	192	197	211	41	44	74	56	57	72	602	620	577
Net	-47	-38	-140	-14	-9	5	-71	-68	-38	-41	-40	-25	-173	-155	-198

Notes:

Net manpower requirements for Anaesthetists based on the service target ratio of 1:13,742 as recommended by the National Committee on Physician Manpower are as follows:

	B.C.	Alta.	Sask.	Man.	Total
1981	-37	37	35	24	59
1985	-44	41	23	14	34
1990	-57	43	9	12	7
2000	-96	48	-23	-11	-82

Surpluses are indicated by (-)

Saskatchewan	1:30,000
Manitoba	1:21,000
Western Canada	1:16,000

Utilization

Data defining the practice patterns of Anaesthestists by age and sex of patients in each of the provinces was used to project future utilization. Details of the methodology employed for this approach are provided in Appendix B.

Service Target Ratio

A service target ratio of 1:16,500 was used. This ratio was developed through adjustment of the guideline of 1:13,742 recommended by the National Committee on Physician Manpower (1975). A discussion of this adjustment is provided in Chapter III.

Net Manpower Requirements

The net manpower requirements indicated in Exhibit IV-8, opposite, suggest an immediate requirement for Anaesthetists in all of the Western Provinces with the exception of British Columbia based on the service target ratio of 1:16,500.

Occupational Issues

The following factors may influence the requirements for Anaesthetists:

- Anaesthesia will continue to be administered by general practitioners who may have received formal training in the field. The medical schools in Western Canada offer general practitioners and family physicians six-month courses in the basics of

anaesthesia. Although these practioners provide satisfactory service in many institutions, an increasing number of institutions require certified anaesthetists to supervise their anaesthetics programs to provide consultations, to administer anaesthesia in difficult cases, and to assume more responsibility for their intensive care facilities.

COMMUNITY MEDICINE

Community Medicine Physicians are concerned with the promotion, protection, and restoration of health by organized community actions.

Currently, the Royal College of Physicians and Surgeons of Canada provides one certificate in the field of Community Medicine. In 1973 the Royal College changed the name of this specialty from Public Health to Community Medicine to broaden its connotation. It has been the practice of the College to grant certification after a physician has completed a Master's Degree in Public Health (or equivalent) and two years of clinical experience.

This specialty is composed of 3 major subspecialties (which are currently not differentiated by the Royal College) as follows:

- Public Health
- Preventive Medicine
- Occupational Health.

Manpower Stock

The active stock of certified specialists in the field of Community Medicine is as follows:

British Columbia	35
Alberta	6
Saskatchewan	14
Manitoba	1
Total	56

EXHIBIT IV-9

AGE DISTRIBUTION OF COMMUNITY MEDICINE SPECIALISTS

AGE GROUP	BRITISH COLUMBIA		ALBERTA		SASKATCHEWAN		MANITOBA		REGION	
	#	%	#	%	#	%	#	%	#	%
20 - 24	-	-	-	-	-	-	-	-	-	-
25 - 29	-	-	-	-	1	7.2	-	-	1	1.8
30 - 34	4	14.3	1	16.7	1	7.2	-	-	7	12.7
35 - 39	5	14.3	1	16.7	2	14.3	-	-	8	14.5
40 - 44	5	14.3	1	16.7	2	14.3	1	100.0	8	14.6
45 - 49	5	14.3	1	16.7	2	14.3	-	-	8	14.5
50 - 54	4	11.3	2	33.2	2	14.3	-	-	8	14.6
55 - 59	4	14.3	-	-	2	14.3	-	-	7	12.7
60 - 64	3	8.6	-	-	1	7.1	-	-	4	7.3
65 +	3	8.6	-	-	1	7.0	-	-	4	7.3
UNKNOWN										
TOTAL	35	100%	6	100%	14	100%	1	100%	56	100%
POP. RATIO	2,647,000 1:75,000		2,082,200 1:349,000		976,970 1:69,000		1,054,400 1:1,054,000		6,787,570 1:123,000	

Service Target Ratio: 1:216,000

See Exhibit III-4 for sources and explanatory notes.

These figures were obtained from the respective provincial Colleges of Physicians and Surgeons.

Exhibit IV-9, opposite, shows the current age distribution of Community Medicine Specialists.

This group of 56 certified specialists is augmented by general practitioners who have indicated a primary interest in public health and who may have completed a degree in Public Health. In Canada in 1975 the ratio of non-certified to certified community medicine practitioners was 3:1.

Calculation of Requirements

In order to estimate net manpower requirements, two ratios were applied to the data to arrive at the figures shown in Exhibit IV-10.

Historical Ratio

The current ratio of Community Medicine specialists to population for each of the provinces is as follows:

British Columbia	1: 75,000
Alberta	1: 349,000
Saskatchewan	1: 69,000
Manitoba	1:1,054,500
Western Canada	1: 123,000

EXHIBIT IV- 10

MANPOWER REQUIREMENTS
COMMUNITY MEDICINE SPECIALISTS

	B.C.	Alberta	Sask.	Manitoba	Total
1981 . Actual	35	6	14	1	56
. Required	13	10	5	5	33
. Net Required	-22	4	-9	4	-23
1985 . Required	14	12	5	6	37
1990 . Required	15	14	6	6	41
2000 . Required	17	19	6	6	46

Notes:

The manpower requirements for community medicine specialists based on the service target ratio of 1:180,000 as recommended by the National Committee on Physician Manpower are as follows:

	B.C.	Alta.	Sask.	Man.	Total
1981	15	12	5	6	38
1985	16	14	6	6	42
1990	18	16	6	6	46
2000	20	19	7	7	53

Surpluses are indicated by (-)

Service Target Ratio

A service target ratio of 1:216,000 was used. This ratio was developed through adjustment of the guideline of 1:180,000 as recommended by the National Committee on Physician Manpower (1975). A discussion of this adjustment is provided in Chapter III.

It should be noted that for this particular specialty the National Committee had difficulty in deriving an appropriate ratio. The Working Committee concerned with Community Medicine suggested ratios of 1:180,000 to 1:62,000 for certified specialists and 1:42,000 to 1:49,000 for non-certified practitioners. The Requirements Committee involved in this same national study could not obtain adequate documentation to support the need and therefore recommended a certified specialty ratio of 1:180,000.

Net Manpower Requirements

The net manpower requirements shown in Exhibit IV-10, opposite, indicate an immediate requirement for community medicine specialists in Alberta and Manitoba based on the service target ratio of 1:180,000.

These figures do not provide a true indication of the requirements, as certified specialists represent a minority of the providers of Community Medicine services. To determine the requirement it would be necessary to take into consideration non-certified practitioners employed in this area.

Occupational Issues

The following factors may influence the requirement for Community Medicine specialists:

- Provincial policy on the employment of non-certified physicians or professionals with health care training other than medicine in salaried positions (mainly administrative) will affect the requirement for certified specialists;

- The number of salaried positions created in each province determines the number of specialists who are able to enter the field;

- The requirements of the Occupational Health sector of this specialty are increasing in response to legislation in the various provinces. A recent Alberta study suggested that 22 Occupational Health Specialists are required for industry and an additional 10 specialists for labour-management health committees, teaching and administration. This suggests a service target ratio of 1:65,400 for certified Occupational Health specialists. Presently there is no Master's program in Occupational Health in Canada, but programs may be initiated at the Universities of Calgary and Toronto.

EXHIBIT IV-11

AGE DISTRIBUTION OF DERMATOLOGISTS

AGE GROUP	BRITISH COLUMBIA		ALBERTA		SASKATCHEWAN		MANITOBA		REGIO
	#	%	#	%	#	%	#	%	#
20 - 24	-	-	-	-	-	-	-	-	-
25 - 29	-	-	-	-	-	-	-	-	-
30 - 34	7	14.6	2	13.3	-	-	2	20.0	11
35 - 39	7	14.6	5	33.3	-	-	2	20.0	14
40 - 44	7	14.6	3	20.0	-	-	1	10.0	11
45 - 49	7	14.6	4	26.7	-	-	-	-	11
50 - 54	6	12.5	-	-	-	-	2	20.0	8
55 - 59	6	12.5	-	-	1	33.3	2	20.0	9
60 - 64	3	6.2	1	6.7	-	-	1	10.0	5
65 +	5	10.4	-	-	2	66.7	-	-	7
UNKNOWN									
TOTAL	48	100%	15	100%	3	100%	10	100%	76
POP. RATIO	2,647,000 1:55,500		2,082,200 1:143,500		976,970 1:325,500		1,054,400 1:118,000		6,787,57 1:91,500

Service Target Ratio: 1:78,400

See Exhibit III-4 for sources and explanatory notes.

DERMATOLOGY

Specialists in Dermatology are concerned with diseases of the skin, skin appendages, and mucous membranes.

Manpower Stock

The active stock of certified Dermatologists based on 1980 data provided by the respective Colleges of Physicians and Surgeons of each province is as follows:

British Columbia	48
Alberta	15
Saskatchewan	3
Manitoba	9
Total	75

Exhibit IV-11, opposite, shows the current age distribution of Dermatologists.

Calculation of Requirements

In order to estimate net manpower requirements, two ratios were applied to the data to arrive at the figures shown in Exhibit IV-12.

Historical Ratio

The current ratio of Dermatologists to population for each of the provinces is identified below:

British Columbia	1: 55,500
Alberta	1:143,500

EXHIBIT IV-12

MANPOWER REQUIREMENTS
DERMATOLOGISTS

	B.C.	Alberta	Sask.	Manitoba	Total
1981 . Actual	48	15	3	9	75
. Required	35	28	13	14	90
. Net Required	-13	13	10	5	15
1985 . Required	37	32	14	14	98
1990 . Required	41	37	15	15	107
2000 . Required	47	45	16	16	123

Notes: Surpluses are indicated by (-)

Saskatchewan	1:325,500
Manitoba	1:118,000
Western Canada	1: 91,500

Service Target Ratio

A service target ratio of 1:78,400 was used. This ratio was developed through adjustment of the guideline of 1:65,300 recommended by the National Committee on Physician Manpower (1975). A discussion of this adjustment is provided in Chapter III.

Net Manpower Requirements

The net manpower requirements shown in Exhibit IV-12, opposite, indicate an immediate need for Dermatologists in all Western Provinces with the exception of British Columbia based on the service target ratio of 1:78,400.

EXHIBIT IV-13

TOTAL NUMBER OF DIAGNOSTIC RADIOLOGISTS IN WESTERN CANADA

Year	British Columbia[1]	Alberta[2]	Saskatchewan[3]	Manitoba[4]	Total
1979	-	96	-	46	-
1980	190	100	43	48	381

Notes:

[1] Roll Call 79, Roll Call Update 80. Report data obtained from College of Physicians and Surgeons of British Columbia.

[2] Alberta Physician Data Bank: Health and Social Services Manpower in Alberta. Report data obtained from the College of Physicians and Surgeons of Alberta.

[3] Saskatchewan Medical Association Monthly Report: Physicians in Saskatchewan by Field of Practice, by Method of Payment.

[4] Health Manpower Provincial Report 1980. Report data obtained from the College of Physicians and Surgeons of Manitoba.

* information which distinguishes Diagnostic Radiologists provided for 1980 only.

DIAGNOSTIC RADIOLOGY

Specialists in Diagnostic Radiology are concerned with the use of ionizing radiation and other imaging techniques in the diagnosis of human disorders. Diagnostic Radiologists provide services to hospital radiology departments and serve in private radiology clinics.

Manpower Stock

Exhibit IV-13, opposite, shows the total number of certified Diagnostic Radiologists in Western Canada who are active in their respective provinces as identified by the sources noted on the Exhibit. Exhibit IV-14, overleaf, shows the current age distribution of Diagnostic Radiologists.

Factors Affecting Manpower Supply

The assumptions made with respect to each of the factors which could affect manpower stock are shown in Exhibit IV-15, overleaf.

Calculation of Requirements

In order to estimate net manpower requirements, three ratios were applied to the data to arrive at the figures shown in Exhibit IV-16.

Historical Ratio

The current ratios of Diagnostic Radiologists to population were used to project the number of specialists required in this discipline in the future to maintain the current levels of manpower. The current ratio for each of the provinces is identified below:

EXHIBIT IV-14

AGE DISTRIBUTION OF DIAGNOSTIC RADIOLOGISTS

AGE GROUP	BRITISH COLUMBIA		ALBERTA		SASKATCHEWAN		MANITOBA		REGION	
	#	%	#	%	#	%	#	%	#	%
20 - 24	-	-	-	-	1	2.2	-	-	1	0.2
25 - 29	1	0.6	-	-	1	2.2	-	-	2	0.5
30 - 34	28	13.7	9	7.3	2	4.3	7	13.5	46	10.8
35 - 39	29	14.2	20	16.3	8	17.4	12	23.1	69	16.2
40 - 44	25	12.2	20	16.3	9	19.6	5	9.6	59	13.9
45 - 49	26	12.7	15	12.2	7	15.2	5	9.6	53	12.5
50 - 54	25	12.2	25	20.3	8	17.4	6	11.5	64	15.1
55 - 59	25	12.2	19	15.4	5	8.7	8	15.4	56	13.2
60 - 64	19	4.5	6	4.9	3	6.5	4	5.8	31	7.3
65 +	26	12.7	9	7.3	3	6.5	6	11.5	44	10.3
UNKNOWN										
TOTAL	204	100%	123	100%	46	100%	52	100%	425	100%
POP. RATIO	2,647,000 1:14,000		2,082,200 1:21,000		976,970 1:22,500		1,054,400 1:23,500		6,787,570 1:18,000	

Service Target Ratio: 1:18,300

See Exhibit III-4 for sources and explanatory notes.

EXHIBIT IV-15

FACTORS AFFECTING MANPOWER SUPPLY
DIAGNOSTIC RADIOLOGISTS, WESTERN CANADA

FACTOR	ASSUMPTIONS BY PROVINCE			
	British Columbia	Alberta	Saskatchewan	Manitoba
Opening Stock	190	100	45	48
Net Migration	4	0	0	0
Net Immigration	2	0	0	0
Net Shift	0	0	0	0
Training Output	5.3	7	2	3.5
Attrition	Current age distribution and assumed retirement at age 65.	See B.C.	See B.C.	See B.C.

Notes:

Opening Stock: See notes on Exhibit IV-9.

Factors: See notes in Appendix A.

EXHIBIT IV-16

NET MANPOWER REQUIREMENTS
DIAGNOSTIC RADIOLOGISTS

	British Columbia			Alberta			Saskatchewan			Manitoba			Total		
1981	Hist. Ratio	Util.	Serv. Tar.	Hist. Ratio	Util.	Serv. Tar.	Hist. Ratio	Util.	Serv. Tar.	Hist. Ratio	Util.	Serv. Tar.	Hist. Ratio	Util.	Serv. Tar.
Required	194	194	146	103	104	117	46	46	53	44	44	58	387	388	374
Net	2	2	-46	-3	-2	11	0	0	7	-5	-5	9	-6	-5	-19
1985															
Required	210	211	158	119	119	135	48	48	56	45	46	59	422	424	408
Net	9	10	-43	-9	-9	7	-2	-2	6	-11	-10	3	-13	-11	-27
1990															
Required	230	233	173	136	136	154	52	51	60	47	48	61	465	468	448
Net	-3	0	-60	-14	-14	4	-3	-4	5	-17	-16	-3	-37	-34	-54
2000															
Required	263	275	198	167	172	190	57	59	67	49	52	64	536	558	519
Net	-33	-21	-98	-28	-23	-5	-3	-1	7	-37	-34	-22	-101	-79	-118

Note:

Net Manpower requirements for Diagnostic Radiologists based on the service target ratio of 1:15,300 recommended by the National Committee on Physician Manpower are as follows:

	B.C.	Alta.	Sask.	Man.	Total
1981	-17	33	18	20	54
1985	-12	42	18	15	63
1990	-26	50	17	10	51
2000	-59	63	20	-9	15

Surpluses are indicated by (-)

British Columbia	1:14,000
Alberta	1:21,000
Saskatchewan	1:22,500
Manitoba	1:23,500
Western Canada	1:18,000

Utilization

Data defining the practice patterns of Diagnostic Radiologists by age and sex of patients in each of the provinces was used to project future utilization. Details of the methodology employed for this approach are provided in Appendix B.

Service Target Ratio

A service target ratio of 1:18,360 was used. This ratio was developed through adjustment of the guideline of 1:15,300 recommended by the National Committee on Physician Manpower (1975). A discussion of this adjustment is provided in Chapter III.

Net Manpower Requirements

The net manpower requirements for Diagnostic Radiologists are identified in Exhibit IV-16, opposite. The projections suggest that there is an immediate requirement for additional Diagnostic Radiologists in Alberta, Saskatchewan and Manitoba based on the service target ratio of 1:18,360.

Occupational Issues

The following may influence the requirements for Diagnostic Radiologists:

- Recent technological developments including computerized axial tomography and ultrasound have significantly increased the scope of

radiological activities. As these technological advances become more widely available, additional demands will be placed on radiologists to provide associated services.

EMERGENCY MEDICINE

Emergency Medicine specialists are physicians concerned with the immediate recognition of and response to acute pathology.

Emergency Medicine is one of four specialties which have been recently recognized by the Royal College of Physicians and Surgeons of Canada. A Royal College examination for certification in Emergency Medicine will be available in 1983. The College of Family Physicians of Canada has established a similar program for Emergency Medicine. Their program admits residents who have completed a two-year family practice residency.

Specialists in Emergency Medicine will obtain salaried positions or make other suitable arrangements (similar to pathologist or radiologist groups) to provide services to hospitals in their emergency departments.

Manpower Stock

As a Royal College examination for this specialty is not currently available, there are no certified specialists in this field. A number of hospitals throughout Western Canada currently utilize non-certified specialists and general practitioners to provide Emergency Medicine services.

Calculation of Requirements

As this specialty is relatively new, there is very little information available on the current supply of requirement for this specialty group. For example, no information on hospitals utilizing non-certified Emergency Medicine specialists was available.

EXHIBIT IV-17

MANPOWER REQUIREMENTS
EMERGENCY MEDICINE SPECIALISTS

	B.C.	Alberta	Sask.	Manitoba	Total
1981 . Required	74	60	27	29	190
1985 . Required	80	69	29	30	208
1990 . Required	88	79	31	31	229
2000 . Required	101	97	34	33	265

Also, the National Committee on Physician Manpower (1975) did not assess the requirements for Emergency Medicine specialists. Due to the lack of data, a different approach was adopted.

If it is assumed that each hospital with over 300 active treatment beds will require 6 Emergency Medicine specialists to provide full coverage, then, for example, Alberta will need 60-84 physicians certified in this discipline. This requirement suggests a service target ratio of 1:31,200 to 1:36,000 for Alberta. This ratio was applied to the other three provinces.

Net Manpower Requirements

Based on the service target ratio of 1:36,000, an immediate requirement for Emergency Medicine specialists exists in Western Canada. Exhibit IV-17, opposite, summarizes these requirements.

Occupational Issues

Specific factors which may influence the future requirements for Emergency Medicine specialists are as follows:

- Emergency Medicine is a new medical specialty which has not been fully recognized across Canada.

- The number of non-certified specialists currently practicing in this field who will be able to obtain certification without further training once the Royal College examination is available will determine the net requirements for additional manpower.

- Hospital policies, hospital accreditation standards, and the supply of certified specialists will influence the speed at which hospitals move to make certification a requirement for Emergency Medicine physicians.

- Provincial governments and the medical community may influence hospital policies regarding the utilization of emergency physicians.

- Physicians may not wish to practice in this demanding specialty for their entire professional careers. If a pattern emerges such that specialists limit their practice of Emergency Medicine to the initial 5-20 years of their careers, more Emergency Medicine Specialists may be required.

- It is expected that the need for certified specialists in Emergency Medicine will be limited to large hospitals. There may also be a need for physicians with specialized emergency training in smaller rural hospitals in the 50-150 bed range. It has been suggested that this requirement could be fulfilled by Family Practitioners who will have completed one additional year of training in Emergency Medicine.

GERIATRIC MEDICINE

Specialists in Geriatric Medicine are concerned with the management of disease and other related problems of the elderly.

Manpower Stock

The active stock of specialists in Geriatric Medicine is as follows:

British Columbia	1
Alberta	5
Saskatchewan	2
Manitoba	3
Total	11

These figures were obtained from the Department of Geriatric Medicine at the Edmonton General Hospital and represent the number of practitioners who are specializing in this field. The figures may include some practitioners certified in Internal Medicine and practitioners who have not yet obtained their certification in Geriatric Medicine. This approach was used as the Colleges of Physicians and Surgeons do not maintain separate listings of the certified specialists in Geriatric Medicine.

Calculation of Requirements

In order to estimate net manpower requirements, two ratios were applied to the data to arrive at the figures shown in Exhibit IV-18.

Historical Ratio

The current ratio of specialists in Geriatric Medicine to population for each of the provinces is as follows:

EXHIBIT IV-18

MANPOWER REQUIREMENTS
GERIATRIC MEDICINE

	B.C.	Alberta	Sask.	Manitoba	Total
1981 . Actual	1	5	2	3	11
. Required	33	27	12	13	85
. Net Required	32	22	10	10	74
1985 . Required	36	31	13	13	93
1990 . Required	39	35	14	14	102
2000 . Required	45	43	15	14	117

British Columbia	1:2,674,000
Alberta	1: 431,000
Saskatchewan	1: 488,500
Manitoba	1: 353,500
Western Canada	1: 624,500

Utilization

This approach was not used for this specialty.

Service Target Ratio

The National Committee on Physician Manpower (1975) did not review or recommend a service target ratio for the specialty of Geriatric Medicine.

As this is an emerging specialty, it is difficult to determine the scope of practice which specialists in Geriatric Medicine will have, and therefore difficult to suggest an appropriate service target ratio.

Based on our discussions with physicians and health educators, a ratio of one specialist in Geriatric Medicine to ten Internists may be appropriate for planning purposes. This relationship with Internists implies a service target ratio of 1:80,000.

Net Manpower Requirements

The net manpower requirements shown in Exhibit IV-18, opposite, indicate an immediate requirement for specialists in Geriatric Medicine based on the service target ratio of 1:80,000.

Occupational Issues

The following factors may influence the requirements for specialists in Geriatric Medicine:

- Geriatric Medicine is an emerging specialty which has not yet been fully accepted by the medical or educational community. As a result, the few practitioners in Western Canada are predominantly immigrants. The shortage of practitioners has limited the ability of the specialty to define its scope of practice;

- The possible scope of practice for specialists in Geriatric Medicine ranges from the provision of primary care to the elderly to a restricted practice providing consultation services to Family Practitioners and other Specialists who are treating elderly patients. Specialists in Geriatric Medicine may also serve in salaried positions as Medical Directors of long-term care institutions;

- The aging of the population will increase the requirement for medical services for the elderly. It is not clear whether the current and future training programs for Family Practitioners, Internists, Psychiatrists, and others will provide appropriate training to meet this need or whether an adequate number of residents enrolled in these programs will be willing to concentrate their practices on the needs of the elderly.

INFECTIOUS DISEASES

Infectious Diseases specialists are persons concerned with the growth of pathogenic micro-organisms in the body. These may or may not be contagious.

Infectious Diseases is one of four specialties which have been recently recognized by the Royal College of Physicians and Surgeons of Canada. A Royal College examination for certification in Infectious Diseases will be available in 1983. Training in the Infectious Diseases will draw upon the diciplines of Internal Medicine and Bacteriology.

Manpower Stock

As a Royal College examination for this specialty is not currently available, there are no certified specialists in this field.

Calculation of Requirements

Historical Ratio

Given the absence of certified specialists in Infectious Diseases, this approach is not appropriate.

Utilization

The approach was not used for this specialty.

Service Target Ratio

The National Committee on Physician Manpower (1975) did not assess the requirements for Infectious Diseases specialists.

EXHIBIT IV-19

MANPOWER REQUIREMENTS
INFECTIOUS DISEASES SPECIALISTS

	B.C.	Alberta	Sask.	Manitoba	Total
1981 . Required	7	5	2	3	17
1985 . Required	7	6	3	3	19
1990 . Required	8	7	3	3	21
2000 . Required	9	9	3	3	24

Based on discussions with medical specialists, a service target ratio of 1:350,000 to 1:500,000 has been developed.

Net Manpower Requirements

Based on the service target ratio of 1:400,000, an immediate requirement for Infectious Diseases specialists exists in Western Canada. Exhibit IV-19, opposite, summarizes these requirements.

EXHIBIT IV-20

AGE DISTRIBUTION OF NEUROLOGISTS

AGE GROUP	BRITISH COLUMBIA		ALBERTA		SASKATCHEWAN		MANITOBA		REGION	
	#	%	#	%	#	%	#	%	#	%
20 - 24	-	-	-	-	-	-	-	-	-	-
25 - 29	-	-	-	-	-	-	-	-	-	-
30 - 34	5	13.9	-	-	-	-	1	9.1	6	8.2
35 - 39	6	16.7	3	16.7	-	-	1	9.1	10	13.7
40 - 44	6	16.7	8	44.4	-	-	5	45.4	19	26.0
45 - 49	5	13.9	3	16.7	3	38.0	2	18.2	13	17.8
50 - 54	4	11.1	1	5.5	2	25.0	-	-	7	9.6
55 - 59	4	11.1	2	11.1	2	25.0	1	9.1	9	12.3
60 - 64	3	8.3	1	5.6	1	12.0	1	9.1	6	8.2
65 +	3	8.3	-	-	-	-	-	-	3	4.2
UNKNOWN										
TOTAL	36	100%	18	100%	8	100%	11	100%	73	100%
POP. RATIO	2,647,000 1:74,000		2,082,200 1:113,500		976,970 1:122,000		1,054,400 1:96,500		6,787,570 1:93,000	

Service Target Ratio: 1:108,000

See Exhibit III-4 for sources and explanatory notes.

NEUROLOGY

Specialists in Neurology are concerned with disorders of the central nervous and peripheral neuromuscular systems.

Manpower Stock

The active stock of certified specialists in Neurology based on the data provided by the respective Colleges of Physicians and Surgeons of each province is as follows:

British Columbia	36
Alberta	19
Saskatchewan	8
Manitoba	11
Total	74

Exhibit IV-20, opposite, shows the current age distribution of Neurologists.

Calculation of Requirements

In order to estimate net manpower requirements, two ratios were applied to the data to arrive at the figures shown in Exhibit IV-21.

Historical Ratio

The current ratio of Neurologists to population for each of the provinces is as follows:

British Columbia	1: 74,000
Alberta	1:113,500

EXHIBIT IV-21

MANPOWER REQUIREMENTS

NEUROLOGISTS

	B.C.	Alberta	Sask.	Manitoba	Total
1981 . Actual	36	19	8	11	74
. Required	25	20	10	10	65
. Net Required	-11	1	2	-1	-9
1985 . Required	27	23	10	11	71
1990 . Required	30	27	11	11	79
2000 . Required	34	33	12	11	90

Notes:

Manpower requirements for Neurologists based on the service target of 1:90,000 recommended by the National Committee on Physician Manpower are as follows:

	B.C.	Alta.	Sask.	Man.	Total
1981	30	24	11	12	77
1985	32	28	12	12	84
1990	35	31	12	12	90
2000	40	39	14	13	106

Surpluses are indicated by (-)

Saskatchewan	1:122,000
Manitoba	1: 96,500
Western Canada	1: 93,000

Utilization

The approach was not used for Neurology.

Service Target Ratio

A service target ratio of 1:108,000 was used. This ratio was developed through adjustment of the guideline of 1:90,000 recommended by the National Committee on Physician Manpower. A discussion of this adjustment is provided in Chapter III.

Net Manpower Requirements

The net manpower requirement in Exhibit IV-21, opposite, indicate a significant surplus of Neurologists in British Columbia based on the service target ratio of 1:108,000. The supply of Neurologists in Alberta, Saskatchewan, and Manitoba has reached a balanced position.

It should be noted that a recent Manitoba assessment of functional versus certified specialists found that only 7 physicians were practicing Neurology (11 Certified).

Occupational Issues Related to Neurology

- The National Committee on Physician Manpower (1975) noted that although the national supply of Neurologists appeared adequate to meet the need, a shortage of paediatric Neurologists exists.

NUCLEAR MEDICINE

Nuclear Medicine specialists are concerned with the diagnostic, therapeutic, and investigative use of radionuclides.

Manpower Stock

The active stock of certified specialists in the field of Nuclear Medicine is as follows:

British Columbia	3
Alberta	1
Saskatchewan	1
Manitoba	3
Total	8

Calculation of Requirements

In order to estimate manpower requirements, two ratios were applied to the data to arrive at the figure shown in Exhibit IV-22.

Historical Ratio

The current ratio of Nuclear Medicine specialists to population for each of the provinces is as follows:

British Columbia	1: 891,000
Alberta	1:2,155,000
Saskatchewan	1: 977,000
Manitoba	1: 354,000
Western Canada	1: 858,500

EXHIBIT IV-22

MANPOWER REQUIREMENTS
NUCLEAR MEDICINE SPECIALISTS

	B.C.	Alberta	Sask.	Manitoba	Total
1981 . Actual	3	1	1	3	8
. Required	5	4	2	2	13
. Net Required	2	3	1	1	7
1985 . Required	6	5	2	2	15
1990 . Required	6	6	2	2	16
2000 . Required	7	7	2	2	18

Notes:

Manpower requirements for Nuclear Medicine Specialists based on the service target of 1:250,000 recommended by the National Committee on Physician Manpower are as follows:

	B.C.	Alta.	Sask.	Man.	Total
1981	11	9	4	4	28
1985	12	10	4	4	30
1990	13	11	4	4	32
2000	15	14	5	5	39

Surpluses are indicated by (-).

Utilization

The approach was not used as the data does not clearly separate this specialty.

Service Target Ratio

A service target ratio of 1:500,000 was used, based on discussions with the National Committee on Physician Manpower. Although the Committee recommended a ratio of 1:250,000 in 1975, this new ratio is now considered appropriate given the changes that have occurred in Diagnostic Radiology. Also, despite the apparent shortage indicated by the earlier service target ratio, no unfilled position or need could be identified.

Net Manpower Requirements

The net manpower requirements in Exhibit IV-22, opposite, indicate an immediate requirement for specialists in Nuclear Medicine in the Western Provinces based on the service target ratio of 1:500,000.

Occupational Issues

The following factors may influence the requirements for specialists in Nuclear Medicine:

- The development of advanced communication techniques which allow the transmission of test results to a central point for interpretation will reduce the requirement to distribute such specialists throughout a geographical region. As a result, it should be

possible for Nuclear Medicine specialists to increase their productivity;

- The specialty of Diagnostic Radiology is broadening to include imaging techniques. As a result, specialized training programs in Nuclear Medicine may be absorbed and amalgamated into the Diagnostic Radiology programs.

EXHIBIT IV-23

TOTAL NUMBER OF PAEDIATRICIANS IN WESTERN CANADA

Year	British Columbia[1]	Alberta[2]	Saskatchewan[3]	Manitoba[4]	Total
1979	150	93	38	67	348
1980	160	101	40	77	378

Notes:

[1] Roll Call 79, Roll Call Update 80. Report data obtained from College of Physicians and Surgeons of British Columbia.

[2] Alberta Physician Data Bank: Health and Social Services Manpower in Alberta. Report data obtained from the College of Physicians and Surgeons of Alberta.

[3] Saskatchewan Medical Association Monthly Report: Physicians in Saskatchewan by Field of Practice, by Method of Payment.

[4] Health Manpower Provincial Report 1980. Report data obtained from the College of Physicians and Surgeons of Manitoba.

PAEDIATRICS

Paediatricians are concerned with diseases of the individual from birth to the end of adolescence, and the medical supervision of growth and development.

Manpower Stock

Exhibit IV-23, opposite, shows the total number of certified Paediatricians in Western Canada who are active in their respective provinces as identified by the sources noted on the Exhibit.

Exhibit IV-24, overleaf, shows the current age distribution for Paediatricians.

Factors Affecting Manpower Supply

The assumptions made with respect to each of the factors which could affect manpower stock are shown in Exhibit IV-25, overleaf.

Calculation of Requirements

In order to estimate net manpower requirements, three ratios were applied to arrive at the figures shown in Exhibit IV-26.

Historical Ratio

The current ratio of Paediatricians to population was used to project the number of Paediatricians required in the future to maintain the current levels of manpower. The current ratio for each of the provinces is as follows:

British Columbia	1:16,500
Alberta	1:20,500

EXHIBIT IV-24

AGE DISTRIBUTION OF PAEDIATRICS

AGE GROUP	BRITISH COLUMBIA		ALBERTA		SASKATCHEWAN		MANITOBA		REGION	
	#	%	#	%	#	%	#	%	#	%
20 - 24	-	-	-	-	-	-	-	-	-	-
25 - 29	1	0.6	-	-	-	-	1	1.3	2	0.5
30 - 34	19	11.9	12	12.0	1	2.5	17	21.5	49	12.9
35 - 39	19	11.9	23	23.0	8	20.0	12	15.2	62	16.4
40 - 44	24	14.9	12	12.0	8	20.0	16	20.2	60	15.8
45 - 49	25	15.6	16	16.0	6	15.0	15	19.0	62	16.4
50 - 54	23	14.4	15	15.0	7	17.5	7	8.9	52	13.7
55 - 59	23	14.4	14	14.0	3	7.5	8	10.1	48	12.7
60 - 64	11	6.9	6	6.0	2	5.0	3	3.8	22	5.8
65 +	15	9.4	2	2.0	5	12.5	-	-	22	5.8
UNKNOWN										
TOTAL	160	100%	100	100%	40	100%	79	100%	379	100%
POP. RATIO	2,647,000 1:16,500		2,082,200 1:20,500		976,970 1:24,000		1,054,400 1:13,500		6,787,570 1:18,000	

Service Target Ratio: 1:21,900

See Exhibit III-4 for sources and explanatory notes.

EXHIBIT IV-25

FACTORS AFFECTING MANPOWER SUPPLY
PAEDIATRICIANS, WESTERN CANADA

FACTOR	ASSUMPTIONS BY PROVINCE			
	British Columbia	Alberta	Saskatchewan	Manitoba
Opening Stock	160	101	40	77
Net Migration	5	4	0	0
Net Immigration	0	1	-1	0
Net Occupational Shift	0	0	0	0
Training Output	5	10	2.5	5
Attrition	Current age distribution and assumed retirement at age 65.	See B.C.	See B.C.	See B.C.

NOTES:

Opening Stock: see notes on Exhibit V-23.

Factors: see Appendix A.

EXHIBIT IV-26

NET MANPOWER REQUIREMENTS
PAEDIATRICS

	British Columbia			Alberta			Saskatchewan			Manitoba			Total		
	Hist. Ratio	Util.	Serv. Tar.	Hist. Ratio	Util.	Serv. Tar.	Hist. Ratio	Util.	Serv. Tar.	Hist. Ratio	Util.	Serv. Tar.	Hist. Ratio	Util.	Serv. Tar.
1981															
Required	163	164	122	105	106	98	41	40	45	78	77	48	387	387	313
Net	-2	-1	-43	-9	-8	-16	0	-1	+4	-3	-4	-33	-14	-14	-88
1985															
Required	177	178	132	120	125	113	43	43	47	80	78	50	420	424	342
Net	-8	-7	-53	-48	-43	-55	-4	-4	0	-20	-22	-50	-80	-76	-158
1990															
Required	193	192	145	137	140	129	46	46	51	82	81	51	458	459	376
Net	-17	-18	-75	-92	-89	-100	-9	-9	-4	-37	-38	-68	-155	-154	-237
2000															
Required	221	195	166	169	153	159	51	47	56	86	80	54	527	475	435
Net	-45	-71	-100	-179	-195	-189	-16	-20	-11	-64	-70	-96	-304	-356	-396

Notes:

Net Manpower requirements for Paediatricians based on the service target ratio of 1:18,260 as recommended by the National Committee on Physician Manpower are as follows:

	B.C.	Alta.	Sask.	Man.	Total
1981	-31	-6	8	-28	-57
1985	-40	-44	5	-46	-125
1990	-52	-88	0	-63	-203
2000	-85	-174	-6	-91	-356

Surpluses are indicated by (-)

Saskatchewan	1:24,000
Manitoba	1:13,500
Western Canada	1:18,000

Utilization

Data defining the practice patterns of Paediatricians by age and sex of patients in each of the provinces was used to project future utilization. Details of the methodology employed for this approach are provided in Appendix B.

Service Target Ratio

A service target ratio of 1:21,900 was used. This ratio was developed through adjustment of the guideline of 1:18,260 recommended by the National Committee on Physician Manpower (1975). A discussion of this adjustment is provided in Chapter III.

Net Manpower Requirements

The net manpower requirements shown in Exhibit IV-26, opposite, suggest that significant net surpluses of Paediatricians have developed in British Columbia, Alberta and Manitoba based on the service target ration of 1:21,900. Saskatchewan is projected to achieve a balance in 1985. The size of the surplus of Paediatricians in Western Canada will grow significantly over the next 20 years.

Occupational Issues

Specific factors which may influence the requirements for Paediatricians are as follows:

- Paediatricians are involved in providing primary, secondary and tertiary care. The proportion of primary care delivered to the youth population has been increasing. This trend can be expected to continue regardless of the increasing number of well-trained Family Practitioners;

- Additional Paediatricians are required in certain subspecialties such as Infectious Diseases, Adolescent Medicine, Allergy and Immunology, Neuro-rehabilitation, and Genetics. The subspecialty area of Neonatology will require a small proportion of the physicians being trained in Paediatrics. A service target ratio of 1:150,000 for Neonatologists was suggested by the National Committee on Physician Manpower (1975).

EXHIBIT IV-27

AGE DISTRIBUTION OF PHYSIATRISTS

AGE GROUP	BRITISH COLUMBIA		ALBERTA		SASKATCHEWAN		MANITOBA		REGION	
	#	%	#	%	#	%	#	%	#	%
20 - 24	-	-	-	-	-	-	-	-	-	-
25 - 29	-	-	-	-	-	-	-	-	-	-
30 - 34	3	18.7	1	14.3	-	-	1	20.0	5	14.7
35 - 39	2	12.5	-	-	2	33.3	2	40.0	6	17.6
40 - 44	24	12.5	-	-	1	16.7	1	20.0	4	11.8
45 - 49	3	18.7	-	-	1	16.7	1	20.0	5	14.7
50 - 54	2	12.5	2	28.6	2	33.3	-	-	6	17.6
55 - 59	2	12.5	3	42.8	-	-	-	-	5	14.7
60 - 64	18	6.3	1	14.3	-	-	-	-	2	5.9
65 +	1	6.3	-	-	-	-	-	-	1	3.0
UNKNOWN										
TOTAL	16	100%	7	100%	6	100%	5	100%	34	100%
POP. RATIO	2,647,000 1:157,000		2,082,200 1:239,000		976,970 1:163,000		1,054,400 1:531,000		6,787,570 1:202,000	

Service Target Ratios: 1:100,000 and 1:50,000

See Exhibit III-4 for sources and explanatory notes.

PHYSICAL MEDICINE AND REHABILITATION

Physiatrists are concerned with medical disorders related to the locomotor system and the application of rehabilitation principles.

Manpower Stock

The active stock of certified specialists in Physical Medicine and Rehabilitation (Physiatrists) based on data provided by the respective Colleges of Physicians and Surgeons of each province is as follows:

British Columbia	17
Alberta	9
Saskatchewan	6
Manitoba	5
Total	37

Exhibit IV-27, opposite, shows the current age distribution for Physiatrists.

Calculation of Requirements

In order to estimate net manpower requirements, two ratios were applied to the data to arrive at the figures shown in Exhibit IV-28.

Historical Ratio

The current ratio of specialists in Physical Medicine and Rehabilitation to population for each of the provinces is as follows:

British Columbia	1:157,000
Alberta	1:239,000

EXHIBIT IV-28

MANPOWER REQUIREMENTS
PHYSIATRISTS

	B.C.	Alberta	Sask.	Manitoba	Total
1981 . Actual	17	9	6	5	37
. Required	26-53	22-43	10-20	10-21	68-137
. Net Required	9-36	13-34	4-14	5-16	31-100
1985 . Required	29-58	25-50	10-21	11-22	75-151
1990 . Required	31-63	23-57	11-22	11-23	76-165
2000 . Required	37-73	35-70	12-25	12-24	96-192

Saskatchewan	1:163,000
Manitoba	1:531,000
Western Canada	1:202,000

Utilization

This approach was not used for Physical Medicine and Rehabilitation.

Service Target Ratio

Two service target ratios were used based on the recommendations of the National Committee on Physician Manpower (1975). The Committee recommended a ratio of 1:100,000 as a realistic goal given the current shortage of Physiatrists. The Committee also recommended that the ratio should be improved to 1:50,000 based on the need for services. Given this wide variance between a realistic goal and the ideal situation, the ratios have not been adjusted.

Net Manpower Requirements

The net manpower requirements shown in Exhibit IV-28, opposite, indicate an immediate requirement for Physiatrists based on either service target ratio (1:100,000 and 1:50,000) for each of the western provinces.

Occupational Issues

The following factors may influence the requirements for Physiatrists:

- Although Physical Medicine and Rehabilitation has been recognized by the Royal College of Physicians and Surgeons for some time, few comprehensive training programs exist which would attract physicians into these residency programs. Given the shortage of these

specialists, it has been difficult for Physiatrists to demonstrate the services which can be provided;

- It should also be noted that the current fee-for-service provisions for Physiatry may be among the factors which discourage physicians from entering this specialty;

- Most Physiatrists currently spend much of their time providing services for agencies such as Workmen's Compensation Boards. As the field of occupational health becomes more important, the demand for Physiatrist services may increase;

- The aging of the population and the objective of maintaining the independence and mobility of the elderly would be supported by an increase in the number of Physiatrists so as to provide services to this segment of the population.

EXHIBIT IV-29

TOTAL NUMBER OF PSYCHIATRISTS IN WESTERN CANADA

Year	British Columbia[1]	Alberta[2]	Saskatchewan[3]	Manitoba[4]	Total
1979	246	93	62	84	485
1980	262	103	64	85	514

Notes:

[1] Roll Call 79, Roll Call Update 80. Report data obtained from College of Physicians and Surgeons of British Columbia.

[2] Alberta Physician Data Bank: Health and Social Services Manpower in Alberta. Report data obtained from the College of Physicians and Surgeons of Alberta.

[3] Saskatchewan Medical Association Monthly Report: Physicians in Saskatchewan by Field of Practice, by Method of Payment.

[4] Health Manpower Provincial Report 1980. Report data obtained from the College of Physicians and Surgeons of Manitoba.

PSYCHIATRY

Specialists in Psychiatry are concerned with emotional and mental disorders, which include psychoses, neuroses, personality problems and severe psychogenic reactions.

Manpower Stock

Exhibit IV-29, opposite, shows the total number of certified Psychiatrists in Western Canada active in their respective provinces as identified by the sources noted the Exhibit. Exhibit IV-30, overleaf, shows the current age distribution for Psychiatrists.

Factors Affecting Manpower Supply

The assumptions made with respect to each of the factors which affect manpower stock are shown in Exhibit IV-31, overleaf.

Calculation of Requirements

In order to estimate net manpower requirements, two ratios were applied to the data to arrive at the figures shown in Exhibit IV-32.

Historical Ratio

The current ratios of Psychiatrists to population were used to project the number of Psychiatrists required in the future to maintain the current levels of manpower. The current ratio for each of the provinces is as follows:

British Columbia	1:10,000
Alberta	1:20,000

EXHIBIT IV-30

AGE DISTRIBUTION OF PSYCHIATRISTS

AGE GROUP	BRITISH COLUMBIA		ALBERTA		SASKATCHEWAN		MANITOBA		REGION	
	#	%	#	%	#	%	#	%	#	%
20 - 24	1	0.4	-	-	1	1.6	-	-	2	0.4
25 - 29	2	0.7	1	0.9	2	3.1	-	-	5	1.0
30 - 34	27	10.3	12	10.9	2	3.1	10	11.9	151	9.8
35 - 39	28	10.7	20	18.2	10	15.6	22	26.2	180	15.4
40 - 44	38	14.5	17	15.5	10	15.6	5	6.0	170	13.5
45 - 49	39	15.0	20	18.2	11	17.2	6	7.1	176	14.6
50 - 54	42	16.0	20	18.2	11	17.2	14	16.7	87	16.7
55 - 59	42	16.0	10	9.1	6	9.4	15	17.8	73	14.0
60 - 64	19	7.1	5	4.5	7	10.9	7	8.3	38	7.3
65 +	24	9.2	5	4.5	4	6.3	5	6.0	38	7.3
UNKNOWN										
TOTAL	262	100%	110	100%	64	100%	84	100%	520	100%
POP. RATIO	2,647,000 1:10,000		2,082,200 1:20,000		976,970 1:15,000		1,054,400 1:10,500		6,787,570 1:13,500	

Service Target Ratio: 1:13,500

See Exhibit III-4 for sources and explanatory notes.

EXHIBIT IV-31

FACTORS AFFECTING MANPOWER SUPPLY
PSYCHIATRISTS, WESTERN CANADA

FACTOR	ASSUMPTIONS BY PROVINCE			
	British Columbia	Alberta	Saskatchewan	Manitoba
Opening Stock	262	103	64	85
Net Migration	5	0	-2	0.3
Net Immigration	0	0.3	0	0
Net Occupational Shift	0	0	0	0
Training Output	7.7	9	2	4
Attrition	Current age distribution and assumed retirement at age 65.	See B.C.	See B.C.	See B.C.

Notes:

Opening Stock: see notes on Exhibit IV-25.

Factors: see notes in Appendix A.

EXHIBIT IV-32

NET MANPOWER REQUIREMENTS
PSYCHIATRISTS

	British Columbia			Alberta			Saskatchewan			Manitoba			Total		
	Hist. Ratio	Util.	Serv. Tar.	Hist. Ratio	Util.	Serv. Tar.	Hist. Ratio	Util.	Serv. Tar.	Hist. Ratio	Util.	Serv. Tar.	Hist. Ratio	Util.	Serv. Tar.
1981															
Required	267	268	203	107	107	163	65	65	74	86	86	80	525	526	520
Net	1	2	-63	-4	-4	52	3	3	12	0	0	-6	0	1	-5
1985															
Required	289	296	219	123	124	188	69	69	78	88	90	82	569	579	567
Net	6	13	-64	-17	-16	48	15	15	24	-6	-4	-12	-2	8	-4
1990															
Required	316	327	240	140	143	214	73	73	84	91	94	85	602	637	623
Net	10	21	-66	-37	-34	37	29	29	40	-10	-7	-16	-8	9	-5
2000															
Required	363	370	275	172	178	264	81	80	93	95	100	89	711	728	721
Net	13	20	-75	-58	-52	34	57	56	69	-29	-24	-35	-17	0	-7

Notes:

Net Manpower requirements for Psychiatrists based on the service target ratio of 1:8,200 to 1:7,700 as recommended by the National Committee on Physician Manpower are as follows:

	B.C.	Alta.	Sask.	Man.	Total
1981	-23	85	27	11	100
1985	-20	86	40	5	111
1990	-18	80	57	1	120
2000	-20	87	88	-11	144

Saskatchewan	1:15,000
Manitoba	1:10,000
Western Canada	1:13,200

Service Target Ratio

A service target ratio of 1:13,200 was used. This ratio was developed through adjustment of the guidelines of 1:11,000 as recommended by the National Committee on Physician Manpower (1975). A discussion of this adjustment is provided in Chapter III. It should be noted that the Committee had difficulty in identifying the requirements and consequently and appropriate target ratio for Psychiatrists.

Net Manpower Requirements

The net manpower requirements shown in Exhibit IV-32, opposite, indicate surpluses of Psychiatrists in British Columbia and Manitoba based on the service target ratio of 1:13,200. Alberta and Saskatchewan require additional Psychiatrists to achieve balanced positions.

RADIATION ONCOLOGY

Radiation Oncologists are concerned with the cure or palliation of malignant diseases and certain other diseases by means of radiation and various non-surgical methods. Radiation Oncologists (or Therapeutic Radiologists) in Canada are salaried specialists who limit their practice to referred patients and are based in cancer treatment centres.

Manpower Stock

The active stock of certified specialists in the field of Radiation Oncology based on data provided by the respective Colleges of Physicians and Surgeons of each province is as follows:

British Columbia	17*
Alberta	17
Saskatchewan	1
Manitoba	4**
Total	39

Calculation of Requirements

In order to estimate net manpower requirements, two ratios were applied to the data to arrive at the figures shown in Exhibit IV-33.

Historical Ratio

The current ratio of Radiation Oncologists to population for each of the provinces is as follows:

---

* includes Radiation Oncologists and 2 of the 5 specialists certified in both Oncology and Diagnostic Radiology.

** it should be noted that the 4 Oncologists in Manitoba are all over the age of 55.

EXHIBIT IV-33

MANPOWER REQUIREMENTS
RADIATION ONCOLOGISTS

	B.C.	Alberta	Sask.	Manitoba	Total
1981 . Actual	14	17	1	4	36
. Required	15	12	6	6	39
. Net Required	1	-5	5	2	3
1985 . Required	16	14	6	6	42
1990 . Required	18	16	6	7	47
2000 . Required	20	19	7	7	53

Notes:

Manpower requirements for Radiation Oncologists based on the service target ratio of 1:154,000 recommended by the National Committee on Physician Manpower are as follows:

	B.C.	Alta.	Sask.	Man.	Total
1981	17	14	6	7	44
1985	19	16	7	7	49
1990	21	18	7	7	53
2000	24	23	8	8	63

Surpluses are indicated by (-)

British Columbia	1:157,000
Alberta	1:127,000
Saskatchewan	1:977,000
Manitoba	1:132,500
Western Canada	1:160,000

Utilization

As this specialty is salary-based, no utilization data is available, so this approach was not used.

Service Target Ratio

A service target ratio of 1:145,200 was used. This ratio was developed through adjustment of the guideline of 1:121,000 recommended by the National Committee on Physician Manpower (1975). A discussion of the adjustment is provided in Chapter III.

It should be noted that the Working Party of the National Committee suggested a ratio of 1:121,000; the higher figure was adopted in recognition of the current national shortage and limited training opportunities for Oncologists.

Net Manpower Requirements

The net manpower requirements in Exhibit IV-33, opposite, indicate a balanced situation for Radiation Oncologists based on the service target ratio of 1:145,200 in the Western Provinces. Alberta currently has a surplus of these specialists.

Occupational Issues

The following factors may influence the requirements for Radiation Oncologists:

- Cancer is a disease of aging. As our population ages, the incidence of cancer-related morbidity will increase;
- A significant increase in cancers among women is expected due to the increase in the number of female smokers. Respiratory cancers are expected to overtake breast cancer in women in the near future;
- Technical advances in this specialty may increase the workload as more conditions become treatable;
- Currently, this specialty is salary-based in Canada. A significant portion of the practitioners emigrated from Great Britain. It is believed that many of these practitioners are approaching retirement;
- In the United States there is a move towards privately-owned cancer clinics treating patients on a fee-for-service basis;
- Radiation treatment may be supplanted to some extent by chemotherapy as evidence that cancer is a systemic disease increases.

EXHIBIT IV-34

TOTAL NUMBER OF LABORATORY SPECIALISTS IN WESTERN CANADA

Year	British Columbia[1]	Alberta[2]	Saskatchewan[3]	Manitoba[4]	Total
1979	96	74	34	31	235
1980	103	76	34	34	244

Notes:

1 Roll Call 79, Roll Call Update 80. Report data obtained from College of Physicians and Surgeons of British Columbia.

2 Alberta Physician Data Bank: Health and Social Services Manpower in Alberta. Report data obtained from the College of Physicians and Surgeons of Alberta.

3 Saskatchewan Medical Association Monthly Report: Physicians in Saskatchewan by Field of Practice, by Method of Payment.

4 Health Manpower Provincial Report 1980. Report data obtained from the College of Physicians and Surgeons of Manitoba.

LABORATORY SPECIALTIES

Examination leading to specialty qualifications are conducted in six Laboratory Specialties by the Royal College of Physicians and Surgeons of Canada. These Laboratory Specialties include:

- General Pathologists, responsible for the diagnosis of disease through the supervision of the production and interpretation of data from all disciplines of laboratory medicine,
- Anatomical Pathologists, responsible for the diagnosis of disease based on gross histologic and cytologic examinations of tissues and fluids removed during life or at autopsy,
- Neuropathologists, responsible for the laboratory analysis of tissues of the nervous system,
- Hematological Pathologists, responsible for the interpretation of laboratory data related to the diagnosis and management of disorders of the blood, the hemopoietic and lymphopoietic system,
- Medical Biochemists, responsible for the clinical and laboratory aspects of biochemistry as applied to medical practice,
- Medical Microbiologists, responsible for the nature and effects of disease-producing organisms and infectious processes.

Manpower Stock

Exhibit IV-34, opposite, contains the total number of certified Laboratory Specialists in Western Canada who are active in their respective provinces as identified by the sources noted on the Exhibit. Exhibit IV-35, overleaf, shows the current age distribution of Laboratory Specialists.

Factors Affecting Manpower Supply

The assumptions made with respect to each of the factors which could affect manpower stock are shown in Exhibit IV-36, overleaf.

EXHIBIT IV-35

AGE DISTRIBUTION OF LABORATORY SPECIALISTS

AGE GROUP	BRITISH COLUMBIA		ALBERTA		SASKATCHEWAN		MANITOBA		REGION	
	#	%	#	%	#	%	#	%	#	
20 - 24	-	-	-	-	1	2.9	-	-	1	
25 - 29	-	-	-	-	1	2.9	-	-	1	
30 - 34	15	14.6	10	13.0	1	2.9	1	2.7	27	1
35 - 39	16	15.5	9	11.7	5	14.8	5	13.5	35	1
40 - 44	16	15.5	16	20.8	6	17.6	7	18.9	45	1
45 - 49	15	14.6	20	25.9	6	17.6	4	10.9	45	1
50 - 54	12	11.7	8	10.4	5	14.8	8	21.6	33	1
55 - 59	12	11.7	9	11.7	4	11.8	3	8.1	28	1
60 - 64	7	6.8	3	3.9	3	8.8	8	21.6	21	
65 +	10	9.6	2	2.6	2	5.9	1	2.7	15	
UNKNOWN										
TOTAL	103	100%	77	100%	34	100%	37	100%	251	10
POP. RATIO	2,647,000 1:25,500		2,082,200 1:27,500		976,970 1:28,500		1,054,400 1:31,000		6,787,570 1:27,800	

Service Target Ratio: 1:15,600

See Exhibit III-4 for sources and explanatory notes.

EXHIBIT IV-36

FACTORS AFFECTING MANPOWER SUPPLY
LABORATORY SPECIALISTS, WESTERN CANADA

FACTOR	ASSUMPTIONS BY PROVINCE			
	British Columbia	Alberta	Saskatchewan	Manitoba
Opening Stock (1980)	103	76	34	34
Net Migration	2	1	0	0
Net Immigration	0	0	-1	0
Net Occupational Shift	0	0	0	0
Training Output	7.5	5.25	2	3
Attrition	Current age distribution and assumed retirement at age 65.	See B.C.	See B.C.	See B.C.

Notes:

Opening Stock: See notes on Exhibit IV-30.

Factors: See notes in Appendix A.

Calculation of Requirements

In order to estimate net manpower requirements, three ratios were applied to the data to arrive at the figures shown in Exhibit IV-37.

Historical Ratio

The current ratios of Laboratory Specialists to population were used to project the number of Laboratory Specialists required in the future to maintain the current levels of manpower. The current ratio for each of the provinces is as follows:

British Columbia	1:25,500
Alberta	1:27,500
Saskatchewan	1:28,500
Manitoba	1:31,000
Western Canada	1:27,800

Utilization

Data defining the practice patterns of Laboratory Specialists by age and sex of patients in each of the provinces was used to project future utilization. Details of the methodology employed for this approach are provided in Appendix B.

A service target ratio of 1:15,500 was used. This ratio was developed through adjustment of the guideline of 1:12,987 recommended by the National Committee on Physician Manpower (1975). A discussion of this adjustment is provided in Appendix B.

The Committees' guideline of 1:12,987 was developed for all the disciplines within the Laboratory Specialties. The ratios which the National Committee

EXHIBIT IV-37

NET MANPOWER REQUIREMENTS
LABORATORY SPECIALISTS

	British Columbia			Alberta			Saskatchewan			Manitoba			Total		
	Hist. Ratio	Util.	Serv. Tar.	Hist. Ratio	Util.	Serv. Tar.	Hist. Ratio	Util.	Serv. Tar.	Hist. Ratio	Util.	Serv. Tar.	Hist. Ratio	Util.	Serv. Tar.
1981															
Required	105	105	171	79	79	138	34	35	63	34	34	68	252	253	440
Net	-5	-5	61	-2	-2	57	0	1	29	-1	-1	33	-8	-7	180
1985															
Required	114	115	186	91	90	159	36	38	66	35	36	70	279	276	481
Net	-26	-25	46	-11	-12	57	2	4	32	-6	-5	29	-41	-38	164
1990															
Required	124	127	203	103	102	181	39	41	71	36	37	72	302	307	527
Net	-57	-54	22	-21	-22	57	5	7	37	-19	-18	+17	-92	-87	133
2000															
Required	143	149	233	127	129	223	43	46	79	38	39	76	351	363	611
Net	-93	-87	-3	-32	-30	64	9	12	45	-38	-37	0	-154	-142	106

Notes:

Net Manpower requirements for Laboratory Specialists based on the service target ratio of 1:12,987 as recommended by the National Committee on Physician Manpower are as follows:

	B.C.	Alta.	Sask.	Man.	Total
1981	96+62	85+58	41+29	47+34	269+332
1985	83+46	89+58	46+33	43+29	261+166
1990	63+23	94+58	51+37	32+18	240+136
2000	44-3	109+65	61+45	15+0	229+107

Surpluses are indicated by (-)

suggested for each of these six specialties are indicated in the first column below. In the second column are the service target ratios derived from applying the adjustment noted above.

	National Committee Guidelines	Adjusted Ratios
Anatomical and Neuropathologists	1: 40,000	1: 48,000
General Pathologists	1: 33,000	1: 40,000
Haematological Pathologists	1:150,000	1:180,000
Sub Total: All Pathologists	1: 16,100	1: 19,300
Medical Biochemists	1:204,000	1:245,000
Medical Microbiologists	1:100,000	1:120,000
Total: All Laboratory Specialists	1: 12,987	1: 15,500

Net Manpower Requirements

The following observations can be made based on the information presented in Exhibit IV-37, opposite:

- The ratio of Laboratory Specialists to population will decrease continually until the year 2000 in all provinces except Saskatchewan;

- If the service target ratio of 1:12,987 is to be achieved by the year 2000, each province will have to increase the number of Laboratory Specialists entering practice over current levels by the following amounts:

British Columbia	2.0
Alberta	5.5

Saskatchewan	3.0
Manitoba	0.75
Total	11.25

Occupational Issues

Specific factors which may influence the requirements for Laboratory Specialists are as follows:

- o steadily increasing utilization of laboratory testing. This trend can be expected to continue unless the provincial departments of health attempt to control utilization;

- o changes in the delivery of laboratory services. This may involve regionalization, increased use of private clinics, and increased automation.

SURGICAL SPECIALTIES

V - SURGICAL SPECIALTIES

The Royal College of Physicians and Surgeons of Canada has grouped the specialty examinations it conducts into two divisions: the Division of Medicine and the Division of Surgery. The specialties within the Division of Surgery are as follows:

Cardiovascular and Thoracic Surgery
General Surgery
Neurosurgery
Obstetrics and Gynecology
Ophthalmology
Orthopedic Surgery
Otolaryngology
Paediatric General Surgery
Plastic Surgery
Thoracic Surgery
Urology
Vascular Surgery*

For analytical purposes, the specialties of Thoracic Surgery and Vascular Surgery have been grouped with Cardiovascular and Thoracic Surgery. Paediatric General Surgery is commented on in the section on General Surgery. Discussion of the manpower requirements for the surgical specialties follows.

* indicates a specialty for which an examination is to be developed by 1983.

CARDIOVASCULAR AND THORACIC, THORACIC AND VASCULAR SURGERY

The Division of Surgery of the Royal College of Physicians and Surgeons of Canada conducts examinations in both Cardiovascular and Thoracic Surgery and in Thoracic Surgery. Effective 1983 an examination for Vascular Surgery will also be available. Because discrete data on each of these related specialties is not available, they have been grouped for the purposes of this analysis.

Definitions

- Cardiovascular and Thoracic Surgeons are concerned with the surgery of congenital and acquired diseases of the heart and great vessels, chest wall, mediastinum, pleura, lungs, esophagus and peripheral arteries,

- Thoracic Surgeons are concerned with congenital and acquired diseases of the chest wall, mediastinum, lungs, pleura, esophagus and diaphragm,

- Vascular Surgeons are concerned with diseases of the blood vessels.

Manpower Stock

The active stock of certified specialists in Cardiovascular and Thoracic Surgery and Thoracic Surgery based on data provided by the respective Colleges of Physicians and Surgeons of each province is as follows:

EXHIBIT V-1

AGE DISTRIBUTION OF CARDIOVASCULAR AND THORACIC SURGEONS

AGE GROUP	BRITISH COLUMBIA		ALBERTA		SASKATCHEWAN		MANITOBA		REGION	
	#	%	#	%	#	%	#	%	#	%
20 - 24	-	-	-	-	-	-	-	-	-	-
25 - 29	-	-	-	-	-	-	-	-	-	-
30 - 34	3	18.7	1	7.7	-	-	2	20.0	60	13.3
35 - 39	2	12.5	2	15.4	1	16.7	-	-	57	11.1
40 - 44	3	18.7	1	7.7	1	16.7	2	20.0	7	15.6
45 - 49	2	12.5	2	15.4	2	33.3	2	20.0	8	17.8
50 - 54	2	12.5	4	30.8	1	16.7	-	-	7	15.6
55 - 59	2	12.5	2	15.4	1	16.6	2	20.0	7	15.5
60 - 64	1	6.2	1	7.6	-	-	-	-	2	4.4
65 +	1	6.2	-	-	-	-	2	20.0	3	6.7
UNKNOWN										
TOTAL	16	100%	13	100%	6	100%	10	100%	45	100%
POP. RATIO	2,647,000 1:121,500		2,082,200 1:166,000		976,970 1:163,000		1,054,400 1:106,000		6,787,570 1:134,500	

Service Target Ratio: 1:140,400

See Exhibit III-4 for sources and explanatory notes.

British Columbia	22*
Alberta	13
Saskatchewan	6
Manitoba	10
Total	51

Exhibit V-1, opposite, shows the current age distribution for Cardiovascular and Thoracic Surgeons.

Calculation of Requirements

In order to estimate net manpower requirements, two ratios were applied to the data to arrive at the figures shown in Exhibit V-2.

Historical Ratio

The current ratio of Cardiovascular and Thoracic and Thoracic Surgeons to population for each of the provinces is as follows:

British Columbia	1:121,500
Alberta	1:166,000
Saskatchewan	1:163,000
Manitoba	1:106,000
Western Canada	1:134,500

Utilization

The approach was not used for this surgical specialty.

---

* British Columbia is the only province providing data which differentiates between Cardiovascular and Thoracic and Thoracic Surgeons. The 22 shown comprise 14 certified Cardiovascular and Thoracic Surgeons and 8 certified Thoracic Surgeons.

EXHIBIT V-2

MANPOWER REQUIREMENTS
CARDIOVASCULAR AND THORACIC, THORACIC AND VASCULAR SURGEONS

MANPOWER REQUIREMENTS

	B.C.	Alberta	Sask.	Manitoba	Total
1981 . Actual	22	13	6	10	51
. Required	19	16	7	8	50
. Net Required	-3	3	1	-2	-1
1985 . Required	21	18	8	8	55
1990 . Required	23	21	8	8	60
2000 . Required	26	25	9	9	69

Notes: Manpower requirements for Cardiovascular and Thoracic, Thoracic and Vascular Surgeons based on the service target ratio of 1:117,000 recommended by the National Committee on Physician Manpower are as follows:

	B.C.	Alta.	Sask.	Man.	Total
1981	23	18	8	9	58
1985	25	21	9	9	64
1990	27	24	9	10	70
2000	31	30	10	10	81

Surpluses are indicated by (-)

Service Target Ratio

A service target ratio of 1:140,400 was used. This ratio was developed through adjustment of the guideline of 1:117,000 recommended by the National Committee on Physician Manpower (1975). A discussion of the adjustment is provided in Chapter III.

Net Manpower Requirements

The net manpower requirements indicated in Exhibit V-2, opposite, suggest that the supply of Cardiovascular and Thoracic and Thoracic Surgeons has reached the required numbers based on the service target ratio of 1:140,000.

Occupational Issues

Specific factors which may influence the requirements for Cardiovascular and Thoracic, Thoracic and Vascular Surgeons are as follows:

- An increasing proportion of vascular surgery is being performed by General Surgeons;
- The aging of the population will increase requirements for the services provided by these specialists. It may be appropriate to move to a service target ratio of 1:120,000 in the future;
- As the number of surgeons specializing in Thoracic or Vascular Surgery increases, the requirement for these specialists will decrease. This decrease will be offset by an increased requirement for coronary artery bypass sugery and cardiac transplantation which will be performed by Cardiac Surgeons.

EXHIBIT V-3

TOTAL NUMBER OF GENERAL SURGEONS IN WESTERN CANADA

Year	British Columbia[1]	Alberta[2]	Saskatchewan[3]	Manitoba[4]	Total
1979	261	140	64	93	558
1980	259	141	64	88	552

Notes:

[1] Roll Call 79, Roll Call Update 80. Report data obtained from College of Physicians and Surgeons of British Columbia.

[2] Alberta Physician Data Bank: Health and Social Services Manpower in Alberta. Report data obtained from the College of Physicians and Surgeons of Alberta.

[3] Saskatchewan Medical Association Monthly Report: Physicians in Saskatchewan by Field of Practice, by Method of Payment.

[4] Health Manpower Provincial Report 1980. Report data obtained from the College of Physicians and Surgeons of Manitoba.

GENERAL SURGERY

General Surgeons are concerned with conditions potentially treatable by an operative procedure. Paediatric General Surgeons are concerned with paediatric care and conditions potentially treatable by an operative procedure. Although it is a distinct, certified specialty, Paediatric General Surgery has been included with General Surgery in this analysis because separate data is not available.

Manpower Stock

Exhibit V-3, opposite, shows the total number of certified General Surgeons and Paediatric General Surgeons in Western Canada who are active in their respective provinces as identified by the sources noted on the Exhibit.

Exhibit V-4, overleaf, shows the current age distribution for General Surgeons.

Factors Affecting Manpower Supply

The assumptions made with respect to each of the factors which could affect manpower stock are shown in Exhibit V-5, overleaf.

Calculation of Requirements

In order to estimate net manpower requirements, three ratios were applied to the data to arrive at the figures shown in Exhibit V-6.

Historical Ratio

The current ratios of General Surgeons to population were used to project the number of General Surgeons required in the future to maintain the

EXHIBIT V-4

AGE DISTRIBUTION OF GENERAL SURGEONS

AGE GROUP	BRITISH COLUMBIA		ALBERTA		SASKATCHEWAN		MANITOBA		REGION	
	#	%	#	%	#	%	#	%	#	%
20 - 24	-	-	-	-	-	-	-	-	-	-
25 - 29	-	-	-	-	-	-	-	-	-	-
30 - 34	20	7.8	5	3.3	1	1.6	4	4.5	30	5.3
35 - 39	21	8.1	18	12.0	9	14.1	9	10.1	57	10.1
40 - 44	29	11.2	15	10.0	10	15.6	10	11.2	64	11.4
45 - 49	30	11.6	21	14.0	11	17.2	8	9.0	70	12.4
50 - 54	43	16.7	28	18.7	11	17.2	16	18.0	98	17.4
55 - 59	43	16.7	23	15.3	10	15.6	18	20.2	94	17.2
60 - 64	27	10.5	24	16.0	9	14.1	11	12.4	71	12.6
65 +	45	17.4	16	10.7	3	4.6	13	14.6	77	13.6
UNKNOWN										
TOTAL	258	100%	150	100%	64	100%	89	100%	561	100%
POP. RATIO	2,647,000 1:10,300		2,082,200 1:14,800		967,970 1:15,300		1,054,400 1:10,800		6,787,570 1:12,100	

Service Target Ratio: 1:13,200

See Exhibit III-4 for sources and explanatory notes.

EXHIBIT V-5

FACTORS AFFECTING MANPOWER SUPPLY
GENERAL SURGEONS, WESTERN CANADA

FACTOR	ASSUMPTIONS BY PROVINCE			
	British Columbia	Alberta	Saskatchewan	Manitoba
Opening Stock	259	141	64	88
Net Migration	6	-0.3	0	-2
Net Immigration	-5	0	-1	-2
Net Occupational Shift	0	0	0	0
Training Output	3	6	4.25	11
Attrition	Current age distribution and assumed retirement at age 65.	See B.C.	See B.C.	See B.C.

Notes:

Opening Stock: see notes on Exhibit V-3.

Factors: see Appendix A.

EXHIBIT V-6

NET MANPOWER REQUIREMENTS
GENERAL SURGEONS

	British Columbia			Alberta			Saskatchewan			Manitoba			Total		
	Hist. Ratio	Util.	Serv. Tar.	Hist. Ratio	Util.	Serv. Tar.	Hist. Ratio	Util.	Serv. Tar.	Hist. Ratio	Util.	Serv. Tar.	Hist. Ratio	Util.	Serv. Tar.
1981															
Required	264	265	203	146	146	163	65	65	74	89	89	80	564	565	520
Net	16	17	-45	8	8	25	0	0	9	-1	-1	10	23	24	-21
1985															
Required	286	288	219	168	167	188	69	68	78	91	92	82	614	615	567
Net	79	81	12	39	38	59	1	0	10	-8	-7	-17	111	112	64
1990															
Required	313	320	240	191	191	214	73	73	84	94	96	85	671	680	623
Net	131	138	58	57	57	80	-1	-1	10	-22	-20	-31	165	174	117
2000															
Required	358	384	275	236	245	264	81	78	93	98	104	89	773	811	721
Net	207	233	124	93	102	121	-4	-7	8	-66	-60	-75	230	268	178

Notes: Net Manpower requirements for General Surgeons based on the service target ratio of 1:11,000 as recommended by the National Committee on Physician Manpower are as follows:

	B.C.	Alta.	Sask.	Man.	Total
1981	-5	55	24	7	81
1985	56	82	27	0	165
1990	106	93	29	-14	214
2000	179	114	32	-57	268

Surpluses are indicated by (-)

current levels of manpower. The current ratio for each of the provinces is as follows:

British Columbia	1:10,300
Alberta	1:14,800
Saskatchewan	1:15,300
Manitoba	1:10,800
Western Canada	1:12,100

Utilization

Data defining the practice patterns of General Surgeons by age and sex of patients in each of the provinces was used to project future utilization.

Service Target Ratio

A service target ratio of 1:13,200 was used. This ratio was developed through adjustment of the guideline of 1:11,000 recommended by the National Committee on Physician Manpower (1975). A discussion of this adjustment is provided in Chapter III.

Included in this General Surgery service target ratio are the requirements for Paediatric General Surgeons. A service target ratio of 1:350,000 has been suggested for the specialty of Paediatric General Surgery.

The Canadian Association of General Surgeons recently recommended a service target ratio of 1:13,000 for General Surgeons.

Net Manpower Requirements

The net manpower requirements indicated in Exhibit V-6, opposite, suggest an immediate requirement for General Surgeons in Alberta and Saskatchewan.

British Columbia and Alberta are projected to have significant shortages in the future; Manitoba will have a large surplus.

Although British Columbia currently has a surplus of General Surgeons, this situation will soon change due to retirements (or reduced levels of activity). Throughout the western provinces the practitioners certified in General Surgery are aged. A large proportion of these specialists will be retiring in the near future.

Occupational Issues

A specific factor which may influence the requirement for General Surgeons is as follows:

- As shown in Exhibit V-4, General Surgeons are an aged group of Specialists. Many of the practitioners in this field will be reducing their levels of activity, and many will be retiring in the next 5 to 10 years.

EXHIBIT V-7

AGE DISTRIBUTION OF NEUROSURGEONS

GE GROUP	BRITISH COLUMBIA		ALBERTA		SASKATCHEWAN		MANITOBA		REGION	
	#	%	#	%	#	%	#	%	#	%
20 - 24	-	-	-	-	-	-	-	-	-	-
25 - 29	-	-	-	-	-	-	-	-	-	-
30 - 34	3	12.0	-	-	-	-	-	-	3	6.0
35 - 39	4	16.0	3	21.4	-	-	1	20.0	8	16.0
40 - 44	4	16.0	3	21.4	-	-	-	-	7	14.0
45 - 49	4	16.0	3	21.4	2	33.3	-	-	9	18.0
50 - 54	3	12.0	1	7.2	2	33.3	1	20.0	7	14.0
55 - 59	3	12.0	1	7.2	1	16.7	1	20.0	6	12.0
60 - 64	2	8.0	-	-	1	16.7	-	-	3	6.0
65 +	2	8.0	3	21.4	-	-	2	40.0	7	14.0
NKNOWN										
TOTAL	25	100%	14	100%	6	100%	5	100%	50	100%
OP. ATIO	2,647,000 1:107,000		2,082,200 1:154,000		976,970 1:163,000		1,054,400 1:212,500		6,787,570 1:137,500	

vice Target Ratio: 1:200,000

Exhibit III-4 for sources and explanatory notes.

NEUROSURGERY

Neurosurgeons are predominantly concerned with the surgical management of disorders affecting the central and peripheral nervous system.

Manpower Stock

The active stock of certified specialists in Neurosurgery based on data provided by the respective Colleges of Physicians and Surgeons of each province is as follows:

British Columbia	25
Alberta	14
Saskatchewan	6
Manitoba	4
Total	49

Exhibit V-7, opposite, show the current age distribution for Neurosurgeons.

Calculation of Requirements

In order to estimate net manpower requirements, two ratios were applied to the data to arrive at the figures shown in Exhibit V-8.

Historical Ratio

The current ratio of Neurosurgeons to population for each of the provinces is as follows:

British Columbia	1:107,000
Alberta	1:154,000

EXHIBIT V-8

MANPOWER REQUIREMENTS
NEUROSURGEONS

	B.C.	Alberta	Sask.	Manitoba	Total
1981 . Actual	25	14	6	5	50
. Required	13	11	5	6	35
. Net Required	-12	-3	-1	1	-15
1985 . Required	15	13	6	6	40
1990 . Required	16	15	6	6	43
2000 . Required	18	18	7	6	49

Notes: Manpower requirements for Neurosurgeons based on the service target ratio of 1:166,700 as recommended by the National Committee on Physician Manpower are as follows:

	B.C.	Alta.	Sask.	Man.	Total
1981	16	13	6	6	41
1985	17	15	6	7	45
1990	19	17	7	7	50
2000	22	21	7	7	57

Surpluses are indicated by (-)

Saskatchewan	1:163,000
Manitoba	1:212,500
Western Canada	1:137,500

Utilization

The approach was not used for this surgical specialty.

Service Target Ratio

A service target ratio of 1:200,000 was used. This ratio was developed through adjustment of the guideline of 1:166,700 recommended by the National Committee on Physician Manpower (1975). A discussion of the adjustment is provided in Chapter III.

Net Manpower Requirements

The net manpower requirements shown in Exhibit V-8, opposite, indicate that Alberta, Saskatchewan and Manitoba have sufficient Neurosurgeons based on the service target ratio of 1:200,000. This ratio would also suggest that British Columbia has a surplus of 9 Neurosurgeons. The National Committee on Physician Manpower (1975) indicated that the supply of Neurosurgeons was in slightly excess of national requirements at the time of the study.

Occupational Issues

Specific factors which may influence the requirements for Neurosurgeons are as follows:

- The number of Neurosurgeons in Western Canada is small and the training period (6-7 years subsequent to medical school graduation) lengthy. As a result, the loss of a single Neurosurgeon will have

an impact on the number of these specialists in a given province. It may be desirable to train a small excess of these specialists to avoid unplanned shortages.

EXHIBIT V-9

TOTAL NUMBER OF OBSTETRICIANS AND GYNECOLOGISTS IN WESTERN CANADA

Year	British Columbia[1]	Alberta[2]	Saskatchewan[3]	Manitoba[4]	Total
1979	140	103	31	59	333
1980	141	107	29	59	336

Notes:

[1] Roll Call 79, Roll Call Update 80. Report data obtained from College of Physicians and Surgeons of British Columbia.

[2] Alberta Physician Data Bank: Health and Social Services Manpower in Alberta. Report data obtained from the College of Physicians and Surgeons of Alberta.

[3] Saskatchewan Medical Association Monthly Report: Physicians in Saskatchewan by Field of Practice, by Method of Payment.

[4] Health Manpower Provincial Report 1980. Report data obtained from the College of Physicians and Surgeons of Manitoba.

OBSTETRICS AND GYNECOLOGY

Obstetricians and Gynecologists are concerned with the health care of women related to reproduction and the reproductive organs.

The Division of Surgery of the Royal College of Physicians and Surgeons of Canada conducts a combined examination in Obstetrics and Gynecology leading to certification.

Manpower Stock

Exhibit V-9, opposite, contains the total number of certified Obstetricians and Gynecologists in Western Canada who are active in their respective provinces as identified by the sources noted on the Exhibit. Exhibit V-10, overleaf, shows the current age distribution for Obstetricians and Gynecologists.

Factors Affecting Manpower Supply

The assumptions made with respect to each of the factors which could affect manpower stock are shown in Exhibit V-11, overleaf.

Calculation of Requirements

In order to estimate net manpower requirements, three ratios were applied to the data to arrive at the figures shown in Exhibit V-12.

Historical Ratio

The current ratios of Obstetricians and Gynecologists to population were used to project the number of specialists required in this discipline in the future

EXHIBIT V-10

AGE DISTRIBUTION OF OBSTETRICIANS & GYNECOLOGISTS

AGE GROUP	BRITISH COLUMBIA		ALBERTA		SASKATCHEWAN		MANITOBA		REGION	
	#	%	#	%	#	%	#	%	#	%
20 - 24	1	0.7	-	-	-	-	-	-	1	0.3
25 - 29	2	1.4	-	-	1	3.5	-	-	3	0.9
30 - 34	14	9.9	11	10.4	1	3.5	2	3.2	28	8.2
35 - 39	15	10.6	10	9.4	4	13.8	6	9.7	35	10.4
40 - 44	20	14.2	18	16.9	5	17.2	12	19.4	55	16.3
45 - 49	20	14.2	16	15.1	5	17.2	10	16.1	51	15.1
50 - 54	22	15.6	20	18.9	4	13.8	13	21.0	59	17.5
55 - 59	22	15.6	13	12.3	4	13.8	7	11.3	46	13.6
60 - 64	8	5.7	11	10.4	5	17.2	8	12.9	32	9.5
65 +	17	12.1	7	6.6	-	-	4	6.4	28	8.2
UNKNOWN										
TOTAL	141	100%	106	100%	29	100%	62	100%	338	100%
POP. RATIO	2,647,000 1:18,500		2,082,200 1:19,500		976,970 1:33,000		1,054,400 1:18,000		6,787,570 1:20,500	

Service Target Ratio: 1:19,800

See Exhibit III-4 for sources and explanatory notes.

EXHIBIT V-11

FACTORS AFFECTING MANPOWER SUPPLY
OBSTETRICIANS AND GYNECOLOGISTS, WESTERN CANADA

FACTOR	ASSUMPTIONS BY PROVINCE			
	British Columbia	Alberta	Saskatchewan	Manitoba
Opening Stock	141	107	29	59
Net Migration	3	0.7	0	0.3
Net Immigration	-2	0	0	0
Net Occupational Shift	0	0	0	0
Training Output	4	6	2	3.5
Attrition	Current age distribution and assumed retirement at age 65.	See B.C.	See B.C.	See B.C.

Notes:

Opening Stock: see notes on Exhibit V-9.

Factors: see Appendix A.

to maintain the current levels of manpower. The current ratio for each of the provinces is as follows:

British Columbia	1:18,500
Alberta	1:19,500
Saskatchewan	1:33,000
Manitoba	1:18,000
Western Canada	1:20,500

Utilization

Data defining the practice patterns of Obstetricians and Gynecologists by age and sex of patients in each of the provinces was used to project future utilization. Details of the methodology employed for this approach are provided in Appendix B.

Service Target Ratio

A service target ratio of 1:19,800 was used. This ratio was developed through averaging and adjusting the guidelines as recommended by the National Committee on Physician Manpower (1975).

The Working Party and the Requirements Committee of the National Committee on Physician Manpower (1975) recommended differing ratios for Obstetricians and Gynecologists. The Working Party suggested that the 1981 requirement would be 1:15,500. The Requirements Committee suggested 1:17,500 as a realistic ratio for planning purposes in 1975. These requirements were based on the assumptions of population growth based on medium fertility and no significant change in patterns of practice.

EXHIBIT V-12

NET MANPOWER REQUIREMENTS OBSTETRICIANS AND GYNECOLOGISTS

	British Columbia			Alberta			Saskatchewan			Manitoba			Total		
	Hist. Ratio	Util.	Serv. Tar.	Hist. Ratio	Util.	Serv. Tar.	Hist. Ratio	Util.	Serv. Tar.	Hist. Ratio	Util.	Serv. Tar.	Hist. Ratio	Util.	Serv. Tar.
1981															
Required	144	145	135	111	111	109	29	29	49	59	60	54	343	345	347
Net	3	4	-6	0	0	-2	-2	-2	18	-1	0	-6	0	2	4
1985															
Required	156	160	146	128	130	125	31	31	52	61	63	55	376	384	378
Net	15	19	5	5	7	2	-7	-7	14	-4	-2	-10	9	17	11
1990															
Required	170	176	160	145	147	143	33	34	56	63	64	57	411	421	416
Net	29	35	19	2	4	0	-13	-12	10	-15	-14	-21	3	13	8
2000															
Required	195	195	183	179	179	176	37	38	62	66	64	60	477	476	481
Net	45	45	33	2	2	-1	-26	-25	-1	-27	-29	-33	-6	-7	-2

Notes: Net Manpower requirements for Obstetricians and Gynecologists based on the service target ratios of 1:15,500 to 1:17,500 as recommended by the National Committee on Physician Manpower are as follows:

	B.C.	Alta.	Sask.	Man.	Total
1981	11to32	12to28	26to33	1to9	50to102
1985	24to46	14to37	26to33	-3to5	61to121
1990	40to63	18to39	24to32	-14to-5	68to129
2000	63to84	22to48	21to30	-26to-17	80to145

Surpluses are indicated by (-)

Net Manpower Requirements

The net manpower requirements for Obstetricians and Gynecologists are identified in Exhibit V-12, opposite. An immediate requirement for additional Obstetricians and Gynecologists is indicated for Saskatchewan based on the service target ratio of 1:19,800. Alberta is projected to remain in balance. The surplus of Obstetricians in Manitoba is expected to increase. The projected deficit for British Columbia assumes a net immigration of -2; if this is reduced to 0, the province should maintain a slight surplus.

Occupational Issues

Specific factors which may influence the requirements for Obstetricians and Gynecologists are as follows:

- The aging of the population and the trend towards smaller families can be expected to continue to influence the incidence of conception;

- Many women are delaying having children. As a result, a larger proportion of women are considered high risks due to their age. More referrals to and more frequent services from obstetricians may be required;

- Technological advances such as fetal monitoring and ultrasound, which facilitate increased antenatal intervention, will result in increased demand for specialists trained in these areas (that is, Obstetricians and Diagnostic Radiologists);

- In 1975 consultations constituted 10% of the workload of Obstetricians and Gynecologists in Canada. These specialists may be able to reduce the proportion of primary care which they provide because an increasing number of family practitioners are able to assume more of the responsibility for well-woman care.

EXHIBIT V-13

TOTAL NUMBER OF OPHTHALMOLOGISTS IN WESTERN CANADA

Year	British Columbia[1]	Alberta[2]	Saskatchewan[3]	Manitoba[4]	Total
1979	132	54	21	27	234
1980	135	54	22	26	237

Notes:

1 Roll Call 79, Roll Call Update 80. Report data obtained from College of Physicians and Surgeons of British Columbia.

2 Alberta Physician Data Bank: Health and Social Services Manpower in Alberta. Report data obtained from the College of Physicians and Surgeons of Alberta.

3 Saskatchewan Medical Association Monthly Report: Physicians in Saskatchewan by Field of Practice, by Method of Payment.

4 Health Manpower Provincial Report 1980. Report data obtained from the College of Physicians and Surgeons of Manitoba.

OPHTHALMOLOGY

Ophthalmologists are concerned with ocular diseases and the correction of aberrations of ocular functions by medical and surgical means.

Manpower Stock

Exhibit V-13, opposite, contains the total number of Ophthalmologists in Western Canada who are active in their respective provinces as identified by the sources noted on the Exhibit. Exhibit V-14, overleaf, shows the current age distribution for Ophthalmologists.

Factors Affecting Manpower Supply

The assumptions made with respect to each of the factors which could affect manpower stock are shown in Exhibit V-15, overleaf.

Calculation of Requirements

In order to estimate net manpower requirements, three ratios were applied to the data to arrive at the figures shown in Exhibit V-16.

Historical Ratio

The current ratio of Ophthalmologists to population were used to project the number of Ophthalmologists required in the future to maintain the current levels of manpower. The current ratio for each of the provinces as follows:

British Columbia	1: 951
Alberta	1:1,257
Saskatchewan	1:1,248
Manitoba	1:1,651
Western Canada	1:1,037

EXHIBIT V-14

AGE DISTRIBUTION OF OPTHALMOLOGISTS

AGE GROUP	BRITISH COLUMBIA		ALBERTA		SASKATCHEWAN		MANITOBA		REGION	
	#	%	#	%	#	%	#	%	#	%
20 - 24	0	-	0	-	0		0		0	
25 - 29	0		0	-	0		1	3.8	1	0.4
30 - 34	19	14.1	3	5.1	1	4.6	1	3.8	24	10.1
35 - 39	20	14.8	8	14.8	3	13.6	4	15.5	35	14.8
40 - 44	16	11.9	11	20.4	3	13.6	2	7.7	32	13.5
45 - 49	17	12.6	8	14.8	3	13.6	3	11.5	31	13.1
50 - 54	21	15.6	10	18.5	4	18.2	3	11.5	38	16.0
55 - 59	21	15.6	3	5.6	4	13.6	3	11.5	30	12.7
60 - 64	8	5.8	6	11.1	3	13.6	4	15.5	21	8.9
65 +	13	9.6	5	9.2	2	9.2	5	19.2	25	10.5
UNKNOWN										
TOTAL	135	100%	54	100%	22	100%	26	100%	237	100%
POP. RATIO	2,647,000 1:19,100		2,082,200 1:35,291		976,970 1:51,419		1,054,400 1:40,550		6,787,570 1:27,800	

ervice Target Ratio: 1:28,000

ee Exhibit III-4 for sources and explanatory notes.

EXHIBIT V-15

FACTORS AFFECTING MANPOWER SUPPLY
OPHTHAMOLOGISTS, WESTERN CANADA

FACTOR	ASSUMPTIONS BY PROVINCE			
	British Columbia	Alberta	Saskatchewan	Manitoba
Opening Stock	135	54	22	26
Net Migration	3	1	0	0
Net Immigration	0	-1	1	0
Net Shift	0	0	0	0
Training Output	2.3	4	1.3	2
Attrition	Current age distribution and assumed retirement at age 65.	See B.C.	See B.C.	See B.C.

Notes:

Opening Stock: see notes on Exhibit V-13.

Factors: see Appendix A.

EXHIBIT V-16

NET MANPOWER REQUIREMENTS
OPTHALMOLOGISTS

	British Columbia			Alberta			Saskatchewan			Manitoba			Total		
	Hist. Ratio	Util.	Serv. Tar.	Hist. Ratio	Util.	Serv. Tar.	Hist. Ratio	Util.	Serv. Tar.	Hist. Ratio	Util.	Serv. Tar.	Hist. Ratio	Util.	Serv. Tar.
1981															
Required	138	138	80	56	56	64	22	22	29	26	26	32	242	242	205
Net	3	3	-55	0	0	8	-1	-1	6	0	0	6	2	2	-35
1985															
Required	149	150	86	64	64	74	24	24	31	27	27	32	264	265	223
Net	10	11	-53	1	1	11	-5	-5	2	0	0	6	5	7	-35
1990															
Required	163	167	94	73	73	84	25	26	33	28	28	33	289	294	244
Net	20	24	-49	-7	-7	4	-12	-11	-4	-6	-6	-1	-5	0	-50
2000															
Required	187	200	108	90	93	104	28	29	37	29	30	35	334	352	284
Net	28	41	-51	-12	-9	2	-25	-24	-16	-19	-18	-13	-28	-10	-78

Notes: Net Manpower requirements for Ophthalmologists based on the service target ratio of 1:28,000 as recommended by the National Committee on Physician Manpower are as follows:

	B.C.	Alta.	Sask.	Man.	Total
1981	-40	21	12	12	5
1985	-36	26	8	12	10
1990	-30	21	3	6	0
2000	-29	22	-9	-6	-22

Surpluses are indicated by (-)

Utilization

Data defining the practice patterns of Ophthalmologists by age and sex of patients in each of the provinces was used to project future utilization. Details of the methodology employed are provided in Appendix B.

Service Target Ratio

A service target ratio of 1:33,600 was used. This ratio was developed through adjustment of the guideline of 1:28,000 recommended by the National Committee on Physician Manpower (1975). A discussion of the adjustment is provided in Chapter III.

It should be noted that the Working Party of this study recommended a ratio of 1:27,600.

Net Manpower Requirements

The net manpower requirements indicated in Exhibit V-16, opposite, suggest that, while British Columbia has a surplus of Ophthalmologists, the remaining Western Provinces are experiencing shortages of these specialists based on the service target ratio of 1:33,600.

Saskatchewan and Manitoba are projected to achieve the service target ratio between 1990 and 1995.

Occupational Issues

Specific factors which may influence the requirements for Ophthalmologists are as follows:

- The role of the Ophthalmologist requires further definition as to its relationship with other professions including optometry and ophthalmic dispensing. It may be appropriate for Ophthalmologists to reduce and eventually eliminate their provision of primary care. Primary care could be provided by optometrists, but it would be necessary to define the role of the Optometrist and the circumstances dictating the referral to an Ophthalmologist of a patient requiring secondary or tertiary care;

- Technology will continue to reduce the time required to provide diagnostic ophthalmological services for the foreseeable future. Technological advances which may be anticipated include automated refraction and automated perimetry;

- The aging population will increase the need for eye care including the provision of highly specialized ophthalmological services.

EXHIBIT V-17

TOTAL NUMBER OF ORTHOPEDIC SURGEONS IN WESTERN CANADA

Year	British Columbia[1]	Alberta[2]	Saskatchewan[3]	Manitoba[4]	Total
1979	103	57	22	31	213
1980	109	59	23	32	223

Notes:

1 Roll Call 79, Roll Call Update 80. Report data obtained from College of Physicians and Surgeons of British Columbia.

2 Alberta Physician Data Bank: Health and Social Services Manpower in Alberta. Report data obtained from the College of Physicians and Surgeons of Alberta.

3 Saskatchewan Medical Association Monthly Report: Physicians in Saskatchewan by Field of Practice, by Method of Payment.

4 Health Manpower Provincial Report 1980. Report data obtained from the College of Physicians and Surgeons of Manitoba.

ORTHOPEDIC SURGERY

Orthopedic Surgeons are concerned with diseases, abnormalities, and injuries which affect the musculoskeletal system.

Manpower Stock

Exhibit V-17, opposite, shows the total number of certified Orthopedic Surgeons in Western Canada who are active in their respective provinces as identified by the sources noted on the Exhibit.

Exhibit V-18, overleaf, shows the current age distribution of Orthopedic Surgeons.

Factors Affecting Manpower Supply

The assumptions made with respect to each of the factors which could affect manpower stock are shown in Exhibit V-19, overleaf.

Calculation of Requirements

In order to estimate net manpower requirements three ratios were applied to the data to arrive at the figures shown in Exhibit V-20.

Historical Ratio

The current ratio of Orthopedic Surgeons to population was used to project the number of Orthopedic Surgeons required in the future to maintain the current levels of manpower. The current ratio for each of the provinces is as follows:

EXHIBIT V-18

AGE DISTRIBUTION OF ORTHOPEDIC SURGEONS

AGE GROUP	BRITISH COLUMBIA		ALBERTA		SASKATCHEWAN		MANITOBA		REGION	
	#	%	#	%	#	%	#	%	#	%
20 - 24	-	-	-	-	-	-	-	-	-	-
25 - 29	-	-	-	-	1	4.4	-	-	1	0.4
30 - 34	18	16.5	5	8.2	1	4.4	1	2.9	25	11.0
35 - 39	19	17.4	13	21.3	2	8.7	5	14.3	39	17.1
40 - 44	16	14.7	7	11.5	3	13.0	9	25.7	35	15.4
45 - 49	17	15.6	12	19.7	4	17.4	10	28.6	43	18.9
50 - 54	10	9.2	10	16.4	3	13.0	1	2.9	24	10.5
55 - 59	11	10.1	7	11.5	4	17.4	4	11.3	26	11.4
60 - 64	7	6.4	5	8.2	3	13.0	3	8.6	18	7.9
65 +	11	10.1	2	3.2	2	8.7	2	5.7	17	7.4
UNKNOWN										
TOTAL	109	100%	61	100%	23	100%	35	100%	228	100%
POP. RATIO	2,647,000 1:24,000		2,082,200 1:35,500		976,970 1:42,000		1,054,400 1:33,000		6,787,570 1:31,000	

Service Target Ratio: 1:36,500

See Exhibit III-4 for sources and explanatory notes.

EXHIBIT V-19

FACTORS AFFECTING MANPOWER SUPPLY
ORTHOPEDIC SURGEONS, WESTERN CANADA

FACTOR	ASSUMPTIONS BY PROVINCE			
	British Columbia	Alberta	Saskatchewan	Manitoba
Opening Stock	109	59	23	32
Net Migration	2	-0.7	0	0
Net Immigration	0	0	0	0
Net Occupational Shift	0	0	0	0
Training Output	3.2	6	2	2
Attrition	Current age distribution and assumed retirement at age 65.	See B.C.	See B.C.	See B.C.

Notes:

Open Stock: see notes on Exhibit V-17.

Factors: see Appendix A.

EXHIBIT V-20

NET MANPOWER REQUIREMENTS
ORTHOPEDIC SURGERY

	British Columbia			Alberta			Saskatchewan			Manitoba			Total		
	Hist. Ratio	Util.	Serv. Tar.	Hist. Ratio	Util.	Serv. Tar.	Hist. Ratio	Util.	Serv. Tar.	Hist. Ratio	Util.	Serv. Tar.	Hist. Ratio	Util.	Serv. Tar.
1981															
Required	111	111	73	61	61	59	23	23	27	32	32	29	277	277	188
Net	0	0	-38	-1	-1	-3	-1	-1	3	-1	-1	-4	-3	-3	-42
1985															
Required	120	121	79	70	70	68	25	25	28	33	33	30	248	249	205
Net	2	3	-39	-8	-8	-10	-3	-3	0	-4	-4	-7	-13	-12	-56
1990															
Required	132	133	87	80	79	77	26	26	30	34	34	31	272	272	225
Net	0	1	-45	-18	-19	-21	-7	-7	-3	-9	-9	-12	-34	-34	-81
2000															
Required	151	157	99	99	100	95	29	29	34	36	36	32	315	322	260
Net	-6	0	-58	-30	-29	-34	-17	-17	-12	-16	-16	-20	-69	-62	-124

Notes: Net Manpower requirements for Orthopedic Surgeons based on the service target ratio of 1:30,400 as recommended by the National Committee on Physician Manpower are as follows:

	B.C.	Alta.	Sask.	Man.	Total
1981	-23	9	8	2	4
1985	-23	4	6	-1	-14
1990	-28	-5	3	-5	-35
2000	-38	-14	-6	-13	-71

Surpluses are indicated by (-)

British Columbia	1:24,000
Alberta	1:35,500
Saskatchewan	1:42,000
Manitoba	1:33,000
Western Canada	1:31,000

Utilization

Data defining the practice patterns of Orthopedic Surgeons by age and sex of patients in each of the provinces was used to project future utilization. Details of the methodology employed for this approach are provided in Appendix B.

Service Target Ratio

A service target ratio of 1:36,500 was used. This ratio was developed through adjustment of the guideline of 1:30,400 recommended by the National Committee on Physician Manpower (1975). A discussion of the adjustment is provided in Chapter III.

It should be noted that the Working Party of this study recommended a ratio of 1:30,000. The Orthopedic Manpower Study of the American Academy of Orthopedic Surgeons suggested a service target ratio of 1:20,000 to 1:30,000 as appropriate.

Net Manpower Requirements

The net manpower requirements indicated in Exhibit V-20, opposite, suggest that, with the exception of British Columbia, Western Canada has a supply of Orthopedic Surgeons which closely reflects the requirements as defined by the service target ratio of 1:36,500. British Columbia has a significant surplus of these specialists.

Occupational Issues

The following factors may influence the requirements for Orthopedic Surgeons:

- The findings of the National Committee on Physician Manpower (1975) suggest that approximately 60% of orthopedic work is performed by physicians other than Orthopedic Surgeons. Physicians performing this work include general surgeons and family practitioners. An increase in the supply of Orthopedic Surgeons relative to the population may result in an increased proportion of orthopedic work being assumed by certified Orthopedic Surgeons;

- Development of new and improved techniques (e.g., total hip and knee replacements) will increase the number of candidates for Orthopedic Surgery;

- Despite the fact that some geographic regions are considered to have an oversupply of orthopedic surgeons, many of the orthopedic surgeons in these areas have long waiting lists of patients. This suggests that there may be significant unmet demand for Orthopedic Surgery.

EXHIBIT V-21

AGE DISTRIBUTION OF OTOLARYNGOLOGISTS

AGE GROUP	BRITISH COLUMBIA		ALBERTA		SASKATCHEWAN		MANITOBA		REGION	
	#	%	#	%	#	%	#	%	#	%
20 - 24	-	-	-	-	-	-	-	-	-	-
25 - 29	-	-	-	-	-	-	-	-	-	-
30 - 34	9	15.2	3	11.1	-	-	2	9.1	14	11.9
35 - 39	9	15.2	4	14.8	2	20.0	-	-	15	12.7
40 - 44	8	13.6	5	18.5	2	20.0	1	4.6	16	13.6
45 - 49	9	15.2	3	11.1	2	20.0	2	9.1	16	13.6
50 - 54	7	11.9	6	22.2	3	30.0	4	18.2	20	16.9
55 - 59	7	11.9	1	3.7	1	10.0	5	22.7	14	11.9
60 - 64	7	6.8	2	7.5	-	-	6	27.3	12	10.1
65 +	6	10.2	3	11.1	-	-	2	9.1	11	9.3
UNKNOWN										
TOTAL	59	100%	27	100%	10	100%	22	100%	118	100%
POP. RATIO	2,647,000 1:45,500		2,082,200 1:80,000		976,970 1:98,000		1,054,400 1:46,000		6,787,570 1:57,500	

Service Target Ratio: 1:60,000

See Exhibit III-4 for sources and explanatory notes.

OTOLARYNGOLOGY

Otolaryngologists are concerned with diseases of the ears, nose, throat, and larynx and their related structures including the neck, bronchi and esophagus.

Manpower Stock

The active stock of certified specialists in Otolaryngology based on 1980 data provided by the respective Colleges of Physicians and Surgeons of each province is as follows:

British Columbia	59
Alberta	27
Saskatchewan	10
Manitoba	19
Total	115

Exhibit V-21, opposite, shows the current age distribution of Otolaryngologists.

Calculation of Requirements

In order to estimate net manpower requirements, two ratios were applied to the data to arrive at the figures shown in Exhibit V-22.

Historical Ratio

The current ratio of Otolaryngologists to population for each of the provinces is as follows:

British Columbia	1:45,500
Alberta	1:80,000

EXHIBIT V-22

MANPOWER REQUIREMENTS
OTOLARYNGOLOGISTS

	B.C.	Alberta	Sask.	Manitoba	Total
1981 . Actual	59	27	10	19	115
. Required	45	36	17	18	116
. Net Required	-14	9	7	-1	1
1985 . Required	49	42	18	19	127
1990 . Required	53	48	19	19	139
2000 . Required	61	59	21	20	161

Notes: Surpluses are indicated by (-)

Saskatchewan	1:98,000
Manitoba	1:46,000
Western Canada	1:57,500

Utilization

The approach was not used for this surgical specialty.

Service Target Ratio

A service target ratio of 1:60,000 was used based on the recommendations of the National Committee on Physician Manpower (1975). Discussions with specialists in this and other fields suggest that this ratio may understate the requirement. In recognition of this requirement, the normal adjustment to provide the appropriate balance between general practitioners and specialists has not been applied to Otolaryngologists.

Net Manpower Requirements

The net manpower requirements indicated in Exhibit V-22, opposite, suggest that the supply of Otolaryngologists in Western Canada has reached the requirement based on the service target ratio of 1:60,000. Alberta and Saskatchewan require additional Otolaryngologists; British Columbia and Manitoba have surpluses of these specialists.

EXHIBIT V-23

AGE DISTRIBUTION OF PLASTIC SURGEONS

AGE GROUP	BRITISH COLUMBIA		ALBERTA		SASKATCHEWAN		MANITOBA		REGION	
	#	%	#	%	#	%	#	%	#	%
20 - 24	-	-	-	-	-	-	-	-	-	-
25 - 29	-	-	-	-	1	16.7	-	-	1	1.6
30 - 34	4	12.9	5	25.0	1	16.7	3	50.0	13	20.6
35 - 39	5	16.1	6	30.0	-	-	-	-	11	17.5
40 - 44	5	16.1	3	15.0	-	-	-	-	8	12.7
45 - 49	4	12.9	2	10.0	2	33.2	2	33.3	10	15.9
50 - 54	4	12.9	1	5.0	1	16.7	1	16.7	7	11.1
55 - 59	4	12.9	3	15.0	1	16.7	-	-	8	12.7
60 - 64	2	6.5	-	-	-	-	-	-	2	3.2
65 +	3	9.7	-	-	-	-	-	-	3	4.7
UNKNOWN										
TOTAL	31	100%	20	100%	6	100%	6	100%	63	100%
POP. RATIO	2,647,000 1:86,000		2,082,200 1:119,500		976,970 1:163,000		1,054,400 1:77,000		6,787,570 1:112,500	

Service Target Ratio: 1:120,000

See Exhibit III-4 for sources and explanatory notes.

PLASTIC SURGERY

Plastic Surgeons are concerned with surgical restoration of appearance and functions altered by injury, time, or disease, with special emphasis on the hand, head, and neck area and the integumentary system.

Manpower Stock

The active stock of certified specialists in Plastic Surgery based on 1980 data provided by the respective Colleges of Physicians and Surgeons of each province is as follows:

British Columbia	31
Alberta	18
Saskatchewan	6
Manitoba	6
Total	61

Exhibit V-23, opposite, shows the current age distribution of Plastic Surgeons.

Calculation of Requirements

In order to estimate net manpower requirements, two ratios were applied to the data to arrive at the figures shown in Exhibit V-24.

Historical Ratio

The current ratio of Plastic Surgeons to population for each of the provinces is as follows:

EXHIBIT V-24

MANPOWER REQUIREMENTS
PLASTIC SURGEONS

	B.C.	Alberta	Sask.	Manitoba	Total
1981 . Actual	31	18	6	6	61
. Required	23	18	9	9	59
. Net Required	-8	0	3	3	-2
1985 . Required	25	21	9	10	65
1990 . Required	21	24	10	10	65
2000 . Required	31	30	11	10	82

Notes: Surpluses are indicated by (-)

British Columbia	1: 86,000
Alberta	1:119,500
Saskatchewan	1:163,000
Manitoba	1:177,000
Western Canada	1:112,500

Utilization

The approach was not used for this surgical specialty.

Service Target Ratio

A service target ratio of 1:120,000 was used. This ratio was developed through adjustment of the guideline of 1:18,260 recommended by the National Committee on Physician Manpower (1975). A discussion of this adjustment is provided in Chapter III.

Net Manpower Requirements

The net manpower requirements shown in Exhibit V-24, opposite, indicate an immediate requirement for three Plastic Surgeons in both Saskatchewan and Manitoba based on the service target ratio of 120,000. British Columbia has a surplus of these Specialists.

Occupational Issues

A specific factor which may influence the requirements for Plastic Surgeons is as follows:

- Plastic Surgery is a new specialty which is popular with recent graduates. Care must be taken to avoid overproduction in this specialty; none of the active practitioners can be expected to retire in the near future.

EXHIBIT V-25

AGE DISTRIBUTION OF UROLOGISTS

AGE GROUP	BRITISH COLUMBIA		ALBERTA		SASKATCHEWAN		MANITOBA		REGION	
	#	%	#	%	#	%	#	%	#	%
20 - 24	-	-	-	-	-	-	-	-	-	-
25 - 29	-	-	-	-	-	-	-	-	-	-
30 - 34	9	15.2	4	12.5	1	8.3	2	9.6	16	12.9
35 - 39	9	15.2	6	18.8	3	25.0	2	9.5	20	16.1
40 - 44	8	13.6	5	15.6	3	25.0	3	14.3	19	15.3
45 - 49	9	15.2	4	12.5	1	8.3	4	19.0	18	14.6
50 - 54	7	11.9	4	12.5	1	8.3	3	14.3	15	12.1
55 - 59	7	11.9	1	3.1	2	16.8	-	-	10	8.1
60 - 64	4	6.8	2	6.2	1	8.3	3	14.3	10	8.1
65 +	6	10.2	6	18.8	-	-	4	19.0	16	12.9
UNKNOWN										
TOTAL	59	100%	32	100%	12	100%	21	100%	124	100%
POP. RATIO	2,647,000 1:45,500		2,062,200 1:74,500		976,970 1:81,500		1,054,400 1:50,500		6,787,570 1:57,000	

Service Target Ratio: 1:60,000

See Exhibit III-4 for sources and explanatory notes.

UROLOGY

Urologists are concerned with diseases of the adrenals, the urinary tract, and the male reproductive tract.

Manpower Stock

The active stock of certified specialists in Urology based on 1980 data provided by the respective Colleges of Physicians and Surgeons of each province is as follows:

British Columbia	59
Alberta	29
Saskatchewan	12
Manitoba	19
Total	119

Exhibit V-25, opposite, shows the current age distribution of Urologists.

Calculation of Requirements

In order to estimate net manpower requirements, two ratios were applied to the data to arrive at the figures shown in Exhibit V-26.

Historical Ratio

The current ratio of Urologists to population for each of the provinces is as follows:

British Columbia	1:45,500
Alberta	1:74,500

EXHIBIT V-26

MANPOWER REQUIREMENTS
UROLOGISTS

	B.C.	Alberta	Sask.	Manitoba	Total
1981 . Actual	59	29	12	19	119
. Required	45	36	17	18	116
. Net Required	14	7	5	-1	-3
1985 . Required	49	42	18	19	127
1990 . Required	53	48	19	19	139
2000 . Required	61	59	21	20	161

Notes: Surpluses are indicated by (-)

Saskatchewan	1:81,500
Manitoba	1:50,500
Western Canada	1:57,000

Utilization

The approach was not used for this surgical specialty.

Service Target Ratio

A service target ratio of 1:60,000 was used. This ratio was developed through adjustment of the guideline of 1:50,000 recommended by the National Committee on Physician Manpower (1975). A discussion of this adjustment is provided in Chapter III.

Net Manpower Requirements

The net manpower requirements indicated in Exhibit V-26, opposite, suggest that the supply of Urologists in Western Canada has reached the numbers required based on the service target ratio of 1:60,000. Alberta and Saskatchewan require additional Urologists, Manitoba has a slight surplus, and British Columbia has a significant surplus of these specialists.

EXHIBIT VI-1

SUMMARY OF RECOMMENDED OUTPUT OF MEDICAL PROGRAMS IN WESTERN CANADA, 1987-2000: GRADUATE PROGRAMS AND POSTGRADUATE PROGRAMS IN THE MEDICAL AND SURGICAL SPECIALTIES

PROGRAMS	RECOMMENDED ANNUAL OUTPUT				
	Western Region	British Columbia	Alberta	Saskatchewan	Manitoba
Graduate Programs	330-350	60-70	140-145*	100	60
Postgraduate Programs					
Medical Specialties					
. Internal Medicine Specialties	13	6-8	4	1-2	3-5
. Anaesthesia	11	1-3	8	1	4-5
. Community Medicine	N.A.	N.A.	N.A.	N.A.	N.A.
. Dermatology	7	N.A.	N.A.	N.A.	N.A.
. Diagnostic Radiology	9	2	7	2-3	2
. Emergency Medicine	10-20	N.A.	N.A.	N.A.	N.A.
. Geriatric Medicine	8	N.A.	N.A.	N.A.	N.A.
. Infectious Diseases	1.25	N.A.	N.A.	N.A.	N.A.
. Neurology	3	N.A.	N.A.	N.A.	N.A.
. Nuclear Medicine	1	N.A.	N.A.	N.A.	N.A.
. Paediatrics	2.25	1-2	1-2	1-2	1-2
. Physical Medicine & Rehabilitation	6-10	N.A.	N.A.	N.A.	N.A.
. Psychiatry	22.7	2-3	11-12	7	1-2
. Radiation Oncology	2.45	N.A.	N.A.	N.A.	N.A.
Sub Total: Medical Specialties**	96.15-110.15				
Laboratory Specialties	26.5	7.5	9-10	5	3
Surgical Specialties					
. Cardiovascular & Thoracic Thoracic & Vascular Surgery	3	N.A.	N.A.	N.A.	N.A.
. General Surgery	37	10-14	12-16	5	6
. Neurosurgery	1-2	N.A.	N.A.	N.A.	N.A.
. Obstetrics & Gynecology	15.5	6-7	6	2	1
. Orthopedic Surgery	4.5	1	3-4	1	1
. Plastic Surgery	2-3	N.A.	N.A.	N.A.	N.A.
. Urology	7	N.A.	N.A.	N.A.	N.A.
Sub Total: Surgical Specialties	70-71				
TOTAL: Recommended Postgraduate Training Output**	166.15-181.15				

Notes: N.A. indicates numbers that were not calculated separately for this region/province.

* Reduction to this level of output is to be delayed until 1989-1990.

** The total excludes community medicine.

VI-FUTURE STRATEGIES

INTRODUCTION

This chapter presents recommendations for meeting the medical manpower requirements of Western Canada. The sequence of this chapter's sections follows the sequence of the earlier chapters. That is, physicians as a single group are discussed first, followed by general practitioners, all specialists, the medical specialties and the surgical specialties. The discussion focuses primarily on training requirements. Analytical commentary and explanations are provided along with the recommendations. The final section, Other Recommendations, deals with non-training recommendations which should be considered in conjunction with the recommended adjustments dealt with in the preceding sections of the chapter.

Exhibit VI-1, opposite, provides a summary of the recommended annual output of medical education programs in Western Canada from 1987 to the year 2000.

ALL PHYSICIANS: RECOMMENDATIONS

Projections were developed for the requirements for physicians over the next 20 years for Western Canada and for each province within the region. (They are discussed in Chapter II.) A service target ratio of 1:630 (physician:population) was used to define manpower requirements for the future population. (Details of the methodology used to project requirements and supply are provided in Chapter II and Appendix B).

If the trends upon which these projections were based continues, the current supply of approximately 11,000 active physicians in Western Canada will increase to over 16,000 by the year 2000. This manpower increase will exceed the requirements of the growing population of Western Canada. The surplus of

physicians is projected to rise from its current level of approximately 500 to 2,000 in the year 2000.

The output of the graduate medical education programs at the five medical schools in Western Canada must be adjusted if the projected manpower surpluses are to be avoided.

The projected surplus of physicians will not be distributed evenly throughout the four western provinces. If adjustments in the levels of graduate medical training are to be used to avert the projected imbalance in the supply of physicians, training responses must be sensitive to the needs of each province.

The adjustments in the provincial medical school enrolments indicated below are based on the premise that each province will wish to retain responsibility for training the number of physicians required for their future needs. However, these adjustments will prove disruptive to the medical schools affected. A number of the provinces may wish to explore the advantages of a training agreement. If, for example, Saskatchewan were to agree with Manitoba and Alberta to train a number of their students, the extent of required adjustments in training levels in the three provinces would be lessened. Other advantages for Saskatchewan of such an agreement include the elimination of the need to provide clinical exposure to an increased number of medical students and the possible lower cost of training students in Manitoba and Alberta as compared with the cost of increasing the size of the University of Saskatchewan medical school.

Based on the projected net manpower requirements for all physicians, the following training responses should be considered.

Western Canada

Recommendation #1

To achieve a balance between the requirement and supply of active physicians in Western Canada by the year 2000, the level of enrolment of medical students in the five graduate medical education programs should be reduced by 25-30% in 1983. The number of students annually entering medical schools in the region would decline from 469 to between 330 and 350.

Although the following recommendations indicate the need to reduce many of the provincial enrolments immediately, it may be more appropriate and more acceptable to introduce a phased plan of gradual reduction over several years. This is a recognized and practical approach to accomplish the objectives of reducing the anticipated physician surplus.

British Columbia

Recommendation #2

Based on the continuing surplus of physicians projected for British Columbia, the number of students annually enrolled in the graduate medical program at the the University of British Columbia should be reduced. Current plans to increase enrolment above the present level of 120 should be abandoned.

Instead, the number of students annually admitted to the program should be reduced to 60-70 in 1983. (This recommendation assumes that adjustment of the training enrolment is the appropriate mechanism for achieving the required manpower supply in British Columbia. See Recommendation #81).

Alberta

Recommendation #3

Alberta should reduce the enrolment of the graduate programs in medical education offered by the University of Alberta and the University of Calgary. So that the requirement for physicians in the province can be met by 1990, enrolment should be maintained through to 1985. In 1986, it will be necessary to reduce the enrolment of the two programs from 190 to 140-145 annually if the surplus of physicians projected for the period 1990 to the year 2000 is to be averted. Since the graduate program at the University of Calgary is of three years' duration, the reduction in enrolment at this school could be delayed until 1987.

Saskatchewan

Recommendation #4

Saskatchewan should increase the enrolment of students in the University of Saskatchewan graduate medical program. To achieve the medical manpower requirements identified for Saskatchewan through adjustment in the level of training, the number of students admitted to the medical school should be increased by as much as 57% in 1983. This adjustment would increase the school's enrolment from 64 to approximately 100 students annually.

Recommendation #5

Before increasing the enrolment of the medical school at the University of Saskatchewan, the feasibility of a training agreement with Manitoba and Alberta should be explored.

Manitoba

Recommendation #6

Manitoba should reduce the enrolment of the graduate medical program at the University of Manitoba if the oversupply of physicians is to be averted and a balance between supply and requirement is to be achieved by the year 2000. The required enrolment reduction of 35-40% will reduce the number of students admitted to the graduate medical education program from the current level of 95 to approximately 60.

ANALYSIS OF TRAINING REQUIREMENTS FOR GENERAL PRACTITIONERS

Medical school graduates must complete one or two years of an approved internship or residency program as a condition of licensure in Canada. Internship and family practice residency positions are allocated to medical graduates wishing to practice as family physicians or general practitioners. In addition, one-year internship positions are required for each of the graduates who will later enter surgical residency programs.

The determination of the appropriate number of internship and family practice residency positions required for physicians intending to practice as general practitioners is further complicated by the number of physicians who enter or return to the supply of general practitioners from sources which do not involve internships or residencies "designated" for general practitioners. Medical graduates who follow these routes for entry or re-entry into the general practice supply include physicians who have left a residency program prior to completion and physicians who have completed residency training but who have not received certification.

These factors influence the total number of internship and family medicine residencies that should be made available to medical school graduates.

Accordingly, the following comments and recommendations are limited to the direction of the adjustments which should be made. These recommendations relate only to the positions which are required for graduates who are to enter general practice and do not take into consideration other adjustments which may be necessary to provide an appropriate number of internships for graduates who will later enter medical or surgical residencies.

GENERAL PRACTITIONERS: RECOMMENDATIONS

The supply of general practitioners in Western Canada for the year 2000 is projected to exceed the identified requirement by less than four percent. Given the many occupational issues which will influence the requirement for physicians in the future, adjustment to the overall output of general practitioners in the western region is not warranted.

It will, however, be necessary to adjust the provincial outputs of general practitioners if a balance between the supply and requirement for general practitioners is to be achieved in each province.

Western Canada

Recommendation #7

Based on the insignificant surplus of general practitioners which will develop over the next 20 years in Western Canada, it is recommended that the current overall regional output of general practitioners and family physicians be maintained.

Recommendation #8

Consideration should be given to delaying the necessary adjustments to the number of internship and family medicine residency positions until

1986-1987, so that they may be coordinated with the graduation of the medical school classes which will have been affected by the enrolment adjustments which are to be implemented in 1983. (The two years for implementation are indicated as the graduate medical programs in Western Canada vary in length from 3 to 4 years.)

British Columbia

Recommendation #9

Given the surplus of general practitioners which has been projected for the year 2000 in British Columbia, the number of internships and family practice residencies should be reduced.

Alberta

Recommendation #10

Alberta should reduce the number of internship and residencies in family medicine it offers to avert the projected surplus of general practitioners.

Saskatchewan

Recommendation #11

Saskatchewan should increase the number of medical graduates admitted to internships and family practice residencies to enable the supply of general practitioners to meet the projected requirements.

Manitoba

Recommendation #12

Manitoba should maintain the current quota on family medicine residencies and internships for a five-year period and review the need for an adjustment in the general practice training quota at that time.

ALL SPECIALISTS

The notion of a single group comprising "all specialists" is a strictly theoretical concept. As is evident from the details provided in Chapters IV and V, many different factors have to be taken into account in determining manpower requirements for each of the specialties. Similarly, the training requirements for each specialty have to be considered individually. It is therefore not appropriate to recommend overall adjustments to the total number of postgraduate residency positions in Western Canada.

It is nevertheless useful to know what the implications of the projected manpower requirements are for postgraduate training in Western Canada over the next twenty years. Accordingly, theoretical calculations have been made to facilitate further assessment of the appropriate output of postgraduate residency programs. The calculations which follow are based on the figures shown in Exhibit III-9. The calculations are not to be construed as recommendations, and they should not be used in determining quotas for postgraduate medical education programs.

Western Canada

To achieve a balance between the supply of and requirement for certified specialists projected in the year 2000, the number of residents admitted to postgraduate training programs leading to certification in a medical or

surgical specialty would have to be reduced by as much as 50% in 1983. The number of residents entering training programs would decline from the current level of 205 to 140-160.

British Columbia

The net manpower requirements projected for all specialists in the year 2000 suggest that the number of physicians admitted to postgraduate residency programs be reduced by as many as 73 residents in 1983. As the current quota of residency positions allows for the annual admission of 77 residents on average, such a reduction is not compatible with the need to provide a program of postgraduate medical education in British Columbia.

Alberta

The net manpower requirement for all specialists in the year 2000 suggests that the current average number of new residents admitted into residency programs be reduced from 109 to approximately 75 in 1983.

Saskatchewan

The Saskatchewan net manpower requirement for all specialists projected for the year 2000 indicates a need to increase the current quota to admit approximately 49 new residents in 1983. At present, 28 residents are admitted annually, on average.

Manitoba

The net manpower requirement for all specialists suggests that an adjustment in the current levels of residency training is required to achieve the appropriate supply of certified specialists by the year 2000. The indicated

adjustment would reduce the average number of residents admitted to postgraduate training programs from 70 to approximately 20 in 1983.

ANALYSIS OF TRAINING REQUIREMENTS FOR THE MEDICAL AND SURGICAL SPECIALTIES

The modifications to the postgraduate training programs which are recommended below result from an analysis of the projected supply and requirments for physicians in Western Canada. The analysis was conducted as follows.

In order to analyse the manpower requirements for the medical and surgical specialties, the specialties were divided into two categories: major specialties and minor specialties. Specialties were classified as major or minor according to the number of practitioners currently certified in each specialty. The ten specialties containing the largest number of currently certified practitioners are thus designated major specialties. The minor specialties comprise those with smaller numbers of certified practitioners and the new specialties to be recognized in 1983.

Different methodologies were applied to project the net manpower requirements of the two groups.

For the major specialties, the supply projections were developed using information concerning current training programs, the current supply, migration, immigration, emigration, occupational shift, and age of retirement. Details of the methodology used to determine future supply are provided in Chapter II and Appendix B. The requirement projections were based upon adjustment of the service target ratios recommended by the National Committee. Further adjustments to reflect increasing or decreasing requirements that will result from changes in the composition of the population related to age and sex have not been made. They were excluded as the anticipated effect from the present to the year 2000 is, as a rule, small in comparison to other

EXHIBIT VI-2

TRAINING REQUIREMENTS

MAJOR SPECIALTIES

WESTERN REGION

	Net Requirements	Current Annual Training Output	Indicated Adjustment in Training Output	Indicated Annual Training Output: 1987-2000
Medical Specialties				
. Internal Medical Specialties	-794	64.75	-56.7	8.05
. Anaesthesia	-198	25.2	-14.0	11.2
. Diagnostic Radiology	-118	17.8	-8.5	9.3
. Paediatrics	-396	22.5	-28.3	0 (-5.8)
. Psychiatry	-7	22.7	-0.6	22.1
Sub Total: Medical Specialties	1513	152.95	-108.1	50.65
Laboratory Specialties	106	17.67	7.6	25.27
Surgical Specialties				
. General Surgery	178	24.25	12.7	36.95
. Obstetrics & Gynecology	1	15.5	0	15.5
. Ophthalmology	-78	9.6	-5.5	4.1
. Orthopaedic Surgery	-124	13.2	-8.8	4.4
Sub Total: Surgical Specialties	-23	62.55	-1.6	60.95
TOTAL: MAJOR SPECIALTIES	1430	233.17	-102.1	136.87

inaccuracies which may be included in the projections due to the limitation of the data base.

To facilitate analysis and interpretation of the recommendations on each of the specialty groups, the percentage change in the volume of required services that will be attributable to changes in the age and sex of the population as differentiated from population growth are indicated in Exhibit VI-3, overleaf. Details of the methodology used to calculate the projected effects of age and sex change are provided in Chapter II in the section titled "Occupational Issues".

The numerical values assigned to each of these factors which could affect manpower supply are stated for each of the major specialties in the relevant sections of Chapters IV and V. The training requirements for the major specialties are summarized in Exhibit VI-2, opposite, for the western region as a whole, and in Exhibits VI-4, VI-5, VI-6, and VI-7, overleaf, for British Columbia, Alberta, Saskatchewan, and Manitoba respectively.

For the minor specialties, the limited size of each specialty group and the inadequacies of the data base precluded the development of manpower supply projections. Therefore, manpower supply projections were not calculated, and accordingly do not appear in the sections on these specialties in Chapers IV and V. Instead, the anticipated supply of practitioners in each of the minor specialties in the year 2000 was estimated. The requirements for specialists in each of the minor groups was calculated using the service target method. Given the number of specialists in each group it was not appropriate to apply the population or utilization approaches for projecting requirements. The resulting projections of training requirements for minor specialties in the western region are summarized in Exhibit VI-8, overleaf. The methodology is explained in the notes appearing on Exhibit VI-8. Recommendations, presented later in the Chapter, are based on these projections.

EXHIBIT VI-3

IMPACT OF AGE AND SEX CHANGE ON REQUIREMENTS FOR SPECIALISTS

	BRITISH COLUMBIA	ALBERTA	SASKATCHEWAN	MANITOBA	TOTAL
Internal Medicine	10.3%	6.4%	3.6%	8.9%	8.2%
Anaesthesia	2.8%	2.6%	2.3%	1.8%	3.0%
Diagnostic Radiology	4.5%	3.9%	3.5%	6.1%	4.1%
Paediatrics	-11.8%	-9.5%	-7.8%	-7.0%	-9.9%
Psychiatry	0.9%	3.5%	-1.2%	5.3%	2.4%
Laboratory Specialists	4.2%	1.5%	7.0%	2.6%	3.4%
General Surgery	7.3%	3.8%	-3.7%	6.1%	4.9%
Obstetrics/Gynecology	0.0%	0.0%	2.7%	-3.0%	-0.2%
Ophthalmology	7.0%	3.3%	3.6%	3.4%	5.4%
Orthopedic Surgery	4.0%	1.0%	0.0%	0.0%	2.2%

Note:

All figures indicate the change which is projected from 1981 to the year 2000.

EXHIBIT VI-4

TRAINING REQUIREMENTS

MAJOR SPECIALTIES
BRITISH COLUMBIA

	Net Requirements	Current Annual Training Output	Indicated Adjustment in Training Output	Indicated Annual Training Output 1987-2000
Medical Specialties				
• Internal Medical Specialties	-129	15	-9.2	5.8
• Anaesthesia	-140	8.7	-10.0	0 (-1.3)
• Diagnostic Radiology	-98	5.3	-7.0	0 (-1.7)
• Paediatrics	-100	5	-7.1	0 (-2.1)
• Psychiatry	-75	7.7	-5.4	2.3
Sub Total: Medical Specialties	-542	41.7	-38.7	8.1
Laboratory Specialties	-3	7.5	-0.2	7.3
Surgical Specialties				
• General Surgery	124	3	8.9	11.9
• Obstetrics & Gynecology	34	4	2.4	6.4
• Ophthalmology	-51	2.3	-3.6	0 (-1.3)
• Orthopaedic Surgery	-58	3.2	-4.1	0 (-0.9)
Sub Total: Surgical Specialties	49	12.5	3.6	18.3
TOTAL: MAJOR SPECIALTIES	-496	61.7	-35.3	33.7

EXHIBIT VI-5

TRAINING REQUIREMENTS

MAJOR SPECIALTIES

ALBERTA

	Net Requirements	Current Annual Training Output	Indicated Adjustment in Training Output	Indicated Annual Training Output 1987-2000
Medical Specialties				
. Internal Medical Specialties	-349	25	-24.9	0.1
. Anaesthesia	5	7.5	0.4	7.9
. Diagnostic Radiology	-5	7	-0.4	6.6
. Paediatrics	-189	10	-13.5	0 (-3.5)
. Psychiatry	34	9	2.4	11.4
Sub Total: Medical Specialties	-504	58.5	-36.0	26.0
Laboratory Specialties	64	5.25	4.6	9.85
Surgical Specialties				
. General Surgery	121	6	8.6	14.6
. Obstetrics & Gynecology	0	6	0	6
. Ophthalmology	2	4	0.1	4.1
. Orthopaedic Surgery	-34	6	-2.4	3.6
Sub Total: Surgical Specialties	89	22	6.3	28.3
TOTAL: MAJOR SPECIALTIES	-351	85.75	-25.1	64.15

EXHIBIT VI-6

TRAINING REQUIREMENTS

MAJOR SPECIALTIES

SASKATCHEWAN

	Net Requirements	Current Annual Training Output	Indicated Adjustment in Training Output	Indicated Annual Training Output 1987-2000
Medical Specialties				
. Internal Medical Specialties	-52	5.25	-3.7	1.55
. Anaesthesia	-38	3	-2.7	0.3
. Diagnostic Radiology	7	2	0.5	2.5
. Paediatrics	-11	2.5	-0.8	1.7
. Psychiatry	69	2	4.9	6.9
Sub Total: Medical Specialties	-25	14.75	-1.8	12.95
Laboratory Specialties	45	2	3.2	5.2
Surgical Specialties				
. General Surgery	8	4.25	0.6	4.85
. Obstetrics & Gynecology	0	2	0	2
. Ophthalmology	-16	1.3	-1.1	0.2
. Orthopaedic Surgery	-12	2	-0.9	1.1
Sub Total: Surgical Specialties	-20	9.55	-1.4	8.15
TOTAL: MAJOR SPECIALTIES	0	26.3	0	26.3

EXHIBIT VI-7

TRAINING REQUIREMENTS

MAJOR SPECIALTIES

MANITOBA

	Net Requirements	Current Annual Training Output	Indicated Adjustment in Training Output	Indicated Annual Training Output 1987-2000
Medical Specialties				
. Internal Medical Specialties	-264	19.5	-18.9	0.6
. Anaesthesia	-25	6	-1.7	4.3
. Diagnostic Radiology	-22	3.5	-1.6	1.9
. Paediatrics	-96	5	-6.9	0 (-1.9)
. Psychiatry	-35	4	-2.5	1.5
Sub Total: Medical Specialties	-442	38.0	-31.6	8.3
Laboratory Specialties	0	3	0	3
Surgical Specialties				
. General Surgery	-75	11	-5.4	5.6
. Obstetrics & Gynecology	-33	3.5	-2.4	1.1
. Ophthalmology	-13	2	-0.9	1.1
. Orthopaedic Surgery	-20	2	-1.4	0.6
Sub Total: Surgical Specialties	-141	18.5	-10.1	8.4
TOTAL: MAJOR SPECIALTIES	-583	59.5	-41.7	19.7

EXHIBIT VI-8

TRAINING REQUIREMENTS

MINOR SPECIALTIES
WESTERN REGION

Medical Specialties	Total Requirement	Net Requirements	Current Annual Training Output	Indicated Adjustment in Training Output	Indicated Annual Training Output 1987-2000
. Community Medicine	46	-58	4.0	-4.1	0 (-0.1)
. Dermatology	123	64	1.3	4.5	6.8
. Emergency Medicine	265	265	1	18	19.0
. Geriatric Medicine	117	110	0.3	7.9	8.2
. Infectious Diseases	24	-7	1.75	-0.5	1.25
. Neurology	90	-11	3.5	-0.8	2.7
. Nuclear Medicine	18	-3	1.0	-0.2	0.8
. Physical Medicine & Rehabilitation	96to192	-4to92	4.8	-0.3to6.6	4.5to11.4
. Radiation Oncology	53	1	2.45	.05	2.5
Sub Total: Medical Specialties	832to928	357to453	20.1	24.55to31.45	45.75to52.65
Surgical Specialties					
. Cardiovascular & Thoracic, Thoracic, & Vascular Surgery	69	-3	3.0	-0.2	2.8
. Neurosurgery	49	-52	4.6	-3.7	0.9
. Otolaryngology	161	30	4.8	2.1	6.9
. Plastic Surgery	81	33	4.5	-2.4	2.1
. Urology	161	40	4.2	2.9	7.1
Sub Total: Surgical Specialties	521	30	21.1	-1.3	19.8
TOTAL MINOR SPECIALTIES	1353to1449	387to483	41.2	23.25to30.15	65.55to72.45

EXHIBIT VI-8, continued

NOTES:

1. Three factors affecting the manpower supply were taken into consideration in calculating the projected supply of practitioners in each of the minor specialties in the year 2000: current regional supply, current training output, and age distribution of current supply assuming retirement at age 65.

2. To determine the net requirement for each specialty for the year 2000, the methods summarized on page VI-12 were used. Surpluses are indicated by (-).

3. The current annual training output was obtained from the separate report entitled The Scope of Existing Physicians' Training Programs, which has been issued to the Steering Committee.

4. The indicated training adjustment was calculated by dividing the net manpower requirement by fourteen. The rationale for this approach is provided on page VI-12.

5. The indicated training output resulted from the application of the indicated training adjustment to the current annual training output. When indicated reductions in training are greater than the current output, the indicated training output is shown as 0. The theoretical negative output resulting from the calculation is shown in brackets.

ASSUMPTIONS UNDERLYING SPECIALTY TRAINING RECOMMENDATIONS

As noted earlier, significant adjustments to the supply of specialists cannot be achieved through training in the short term because of the length of the residency training programs. It has therefore been assumed that the year 2000 represents a realistic goal by which to achieve a balance between the supply of and requirement for practitioners in the specialty groups. The recommendations for appropriate levels of specialty training are based on calculations that assume the year 2000 as the target for achieving a balance between supply and requirements.

Other assumptions made in determining the required training levels are as follows:

- the recommended adjustment of the number of physicians entering residency training will be fully implemented in 1983;
- each training program will require four years for completion. As a result, the adjustments to the training programs cannot begin to influence the manpower supply until 1987. (Residents entering the adjusted programs will be eligible for certification in 1987 at the earliest);
- all residency positions will be filled, and all residents will receive certification four years after entering their respective programs.

To determine the training adjustment required to achieve balance by the year 2000, the net requirement identified (based on the service target ratio and the supply projections) was divided by 14 for the following reason. If programs adjust their intake in 1983 (thus producing their first group of

"post-adjustment" graduates in 1987), 14 groups of "post-adjustment" residents can be graduated annually by the year 2000.

The preceeding recommendations dealing with the training output of the basic medical programs indicate the need to reduce the output in several western provinces. Many of the recommendations which follow related to the specialty programs suggest similar reductions. Once again a gradual reduction in residency training levels may be more appropriate and acceptable. A phased reduction in residency training levels would provide a realistic approach which would accomplish the objective of reducing the anticipated physician surplus.

FACTORS AFFECTING SPECIALTY TRAINING RECOMMENDATIONS

The training recommendations for each of the specialty groups concentrate on adjustments in training levels which will reduce imbalances between the projected supply of and requirement for practitioners in each specialty.

Before any of the recommendations are implemented, several factors must be considered. A discussion of these factors follows.

National and International Responsibilities

Many older and larger medical schools offer programs in particular specialties which are known for their excellance. Similarly, a number of highly specialized programs such as paediatric neurosurgery are offered at only one university in Canada.

The medical schools at the University of Toronto and McGill University, offer a number of these programs. It must be recognized that medical schools in Eastern Canada will continue to train a number of the subspecialties for Western Canada.

As the medical schools in Western Canada continue to mature, an increasing number of their programs will develop national and international reputations for excellance. These programs should be recognized and additional residency positions provided so that western schools may assume greater educational responsibilities nationally and internationally.

Distribution

Several factors influence physicians in deciding where they will establish their practices. For example, specialists offering secondary and tertiary care services often choose to practice in large urban centres where the sophisticated diagnostic and therapeutic facilities which they require are located.

These factors result in a "skewed" distribution of physicians: many urban centres are over-serviced, while many rural areas in the Western Provinces are unable to attract the specialists needed for the programs which health authorities wish to develop.

Numerous incentives have been suggested to encourage physicians to locate in these under-serviced areas. The development of measures to control physicians' choice of locale for setting up a practice has been discussed as one means of reducing the medical services delivery problems caused by maldistribution.
An alternative to this interventionist approach is to train enough physicians in each of the specialties required in the under-serviced areas to ensure that a sufficient number of general practitioners and specialists would choose to locate in under-serviced rural areas where they could develop practices of adequate scope and size.

If medical manpower is to be provided to the rural areas through the action of "market forces", it may be appropriate to train an over-supply of general

practitioners and specialists. However, the cost of medical services which would result from "saturating" the market with medical manpower could be expected to be prohibitive.

Attrition Prior to Certification

The net manpower requirement upon which the training recommendations have been based assume that all residency positions are filled and that all residents who are accepted into these positions complete training, are certified, and commence practice in the province where they trained.

This represents an oversimplification of the postgraduate medical education process.

Factors which should be taken into consideration in determining the appropriate quotas for each postgraduate residency program include:

- the number of residents who will not complete training (this figure may approach 5%-10% of those who are granted residency positions),
- the number of residency positions allocated for upgrading or other training which will not lead to certification,
- the number of residents who complete training but do not obtain certification (the Royal College of Physicians and Surgeons of Canada estimates that less than 5% of residents completing training will not obtain certification),
- the number of foreign residents accepted into a program who will not practice in Canada upon certification.

Other Factors

Other factors that have a bearing on the specialty training recommendations are dicussed in a later section of this chapter, General Recommendations Applying to Medical Training Adjustments.

LIMITATIONS OF SPECIALTY TRAINING RECOMMENDATIONS

Inherent limitations exist in the application of manpower planning methodologies to the specialties. The provincial requirements in each specialty are relatively small; thus, errors in the assumptions made for the various groups can result in significant errors in the projected requirements. In most health care professions, it is wisest to concentrate upon the short-term projections as they tend to be the most accurate. In medicine, however, the length of time required to train a specialist precludes the use of adjustments to training levels as a means of adjusting supply in the short term. Similarly, short-term projections of requirements cannot be used to identify the appropriate training output for programs of four or more years' duration. Training recommendations must accordingly be based on medium and long-term projections.

This dependence on medium and long-term projections increases the probability that significant errors will result. If for example, actual net migration or net immigration in the future diverge from the figures which have been developed using the available data for these two factors, the cumulative effect of the annual inclusion of this error in the supply projections will be considerable.

The validity of the training recommendations is dependent upon the underlying assumptions which have been made regarding supply and requirements.

MEDICAL SPECIALTIES: RECOMMENDATIONS

Recommendations are presented below for the specialties in the Clinical and Laboratory sections of the Division of Medicine of the Royal College of Physicians and Surgeons of Canada.

INTERNAL MEDICINE

The recommendations for this specialty embrace certified internists, allergists, cardiologists, clinical immunologists, haematologists, gastroenterologists, nephrologists, respirologists, and rheumatologists, as a group.

Western Canada

Recommendation #13

Western Canada should reduce its current training output of internal medicine specialists of approximately 65 per year by as much as 80%, starting in 1983.

Recommendation #14

The western provinces should review the projected supply of practitioners who will be certified in each of the subspecialties of internal medicine and concentrate future training efforts on subspecialties for which requirements are identified.

British Columbia

Recommendation #15

British Columbia should consider reducing its residency program in internal medicine so that 6-8 residents enter the program annually.

Alberta

Recommendation #16

Alberta should reduce the size of its internal medicine program so that an average of no more than four residents complete training and receive certification annually.

Saskatchewan

Recommendation #17

Saskatchewan should reduce the number of specialists trained in internal medicine to a level of 1-2 annually.

Manitoba

Recommendation #18

Manitoba should consider reducing its internal medicine program so that no more than 3-5 residents enter the program annually.

ANAESTHESIA

In order to avoid the significant surplus of anaesthetists projected for the year 2000 in Western Canada, current training levels in this specialty must be reduced.

Western Canada

Recommendation #19

Western Canada should reduce the training programs in anaesthesia by approximately 50% commencing in 1983, so that approximately 11 anaesthetists are graduated and certified annually.

British Columbia

Recommendation #20

British Columbia should consider reducing its program by admitting 1-3 residents annually.

Alberta

Recommendation #21

Alberta should increase the annual intake of its anaesthesia programs to approximately 8 entrants.

Saskatchewan

Recommendation #22

Saskatchewan should consider reducing the number of residents admitted to its anaesthesia program to one annually.

Manitoba

Recommendation #23

Manitoba should reduce its anaesthesia program so that 4-5 residents complete their training annually.

COMMUNITY MEDICINE

Western Canadian requirements for community medicine specialists will be met by increases to the present supply that will occur as those currently in training receive certification.

As most certified community medicine specialists seek salaried posts, the number of practitioners needed to fill the positions that are to be made available will constitute a large part of the provinces' actual requirements.

Western Canada

Recommendation #24

The western provinces should train a sufficient number of practitioners to fill the number of future funded positions for community medicine specialists that can be identified in the public and industrial sectors.

DERMATOLOGY

The number of training positions available in dermatology will have to be substantially increased if the current and projected requirements for dermatologists are to be achieved through training. At present, only the University of British Columbia offers a program in dermatology.

Recommendation #25

The western provinces should consider the development of additional programs in dermatology to enable approximately 7 dermatology residents to commence training annually.

DIAGNOSTIC RADIOLOGY

The number of residents' positions in this specialty will have to be sharply reduced if the projected surplus is to be avoided.

Western Canada

Recommendation #26

In order to achieve a balance between the supply and requirement by the year 2000, the number of residents entering diagnostic radiology programs should be reduced from approximately 18 to 9 for the entire western region in 1983.

British Columbia

Recommendation #27

British Columbia should reduce its diagnostic radiology program to produce, on average, no more than 2 specialists annually.

Alberta

Recommendation #28

Alberta should maintain its current level of training in diagnostic radiology.

Saskatchewan

Recommendation #29

Saskatchewan should consider a slight increase in the output of its diagnostic radiology program so that, on average, 2-3 residents receive certification annually.

Manitoba

Recommendation #30

Manitoba should consider reducing its program so that, on average, two residents in diagnostic radiology complete their training annually.

EMERGENCY MEDICINE

One program in emergency medicine has been developed in Western Canada by the Canadian College of Family Physicians at the University of Calgary. Both the Royal College of Physicians and Surgeons and the Canadian College of Family Physicians have established preliminary guidelines for separate but similar programs leading to certification in emergency medicine.

Based on this study's initial projections, sufficient training capacity should be developed to train 10-20 new residents annually in Western Canada.

Western Canada

Recommendation #31

The western provinces should encourage the Royal College of Physicians and Surgeons of Canada and the Canadian College of Family Physicians to establish a single authority responsible for training, curriculum content, and certification in the program.

Recommendation #32

The number of practitioners currently specializing in emergency medicine who will receive certification in this new specialty from the Royal College of Physicians and Surgeons or the Canadian College of Family Physicians should be determined before establishing the quota for residents entering emergency training programs.

Recommendation #33

The western provinces should develop training programs in emergency medicine which would provide an initial output of 7-10 specialists annually.

GERIATRIC MEDICINE

The number of training programs in geriatric medicine and the number of residents accepted into these programs must be increasesd if the requirements identified for specialists in this field are to be met.

The role of practitioners in geriatric medicine may require further review since it is a specialty which has not achieved wide acceptance in the medical or educational communities.

Western Canada

Recommendation #34

Subject to confirmation of the role of the specialist in geriatric medicine, training programs should be developed in Western Canada to provided an annual output of approximately 8 specialists in geriatric medicine.

INFECTIOUS DISEASES

The current levels of output at the two universities offering training in the minor specialty of infectious diseases should be slightly reduced.

As infectious diseases will not be recognized as a specialty by the Royal College until 1983, the number of specialists currently practicing in this field who will receive certification should be determined in the future.

Western Canada

Recommendation #35

The western provinces should consider reducing the level of training of specialists in infectious diseases from 1.75 to approximately 1.25 annually.

NEUROLOGY

The projected requirements for neurologists in Western Canada suggest that a slight reduction in the current training output is warranted.

Western Canada

Recommendation #36

The western provinces should consider a reduction in the number of residents trained for certification in neurology so that it does not exceed 3 annually.

NUCLEAR MEDICINE

The slight reduction in the number of residents trained in nuclear medicine indicated by the identified requirement may not warrant disruption to the one program provided, at the University of Alberta.

Alberta

Recommendation #37

The province of Alberta should maintain the current level of training for residents specializing in nuclear medicine so that Western Canadian requirements can continue to be met.

PAEDIATRICS

The current level of training of paediatricians in Western Canada will result in a large surplus of these specialists by the year 2000.

Western Canada

Recommendation #38

On the basis of the population and supply projections developed for the next 20 years, it is recommended that paediatrics training programs in Western Canada be reduced by as much as 90% in order to achieve a balance between supply and requirements.

British Columbia

Recommendation #39

British Columbia should consider reducing its paediatric training program so that no more than 1 to 2 residents enter the program annually.

Alberta

Recommendation #40

Alberta should reduce the size of the paediatric training programs so that, on average, the number of residents completing training annually is reduced to 1 to 2.

Saskatchewan

Recommendation #41

Saskatchewan should reduce the current level of training in paediatrics so that 1 to 2 residents are accepted into the program annually.

Recommendation #42

Manitoba should consider reducing the output of its paediatric program so that 1 to 2 residents complete training annually.

PHYSICAL MEDICINE AND REHABILITATION

More residency positions for physical medicine and rehabilitation are required if manpower requirements identified for this specialty are to be realized.

The role of the physiatrist may require further consideration, as the previous recommendations of manpower planners have not brought about the indicated increases in the number of residents entering training in this specialty.

Western Canada

Recommendation #43

Subject to further definition of the role and scope of practice of specialists certified in physical medicine and rehabilitation, the number of residents accepted into physiatry training programs in the western provinces should be increased to 6 to 10 annually.

PSYCHIATRY

The requirements for psychiatrists in Western Canada suggest that a minor reduction in the current level of training may be appropriate but that a redistribution of the quota of psychiatrists to be trained in each of the western provinces is required.

Western Canada

Recommendation #44

As the current output of the postgraduate training programs in psychiatry appears to meet the requirement in Western Canada projected for the year 2000, no changes should be made that would alter the current overall output of trained psychiatrists in the western region.

British Columbia

Recommendation #45

British Columbia should consider reducing the size of its psychiatry training program to provide an annual output of 2 to 3 certified specialists.

Alberta

Recommendation #46

Alberta should consider increasing the number of residents entering the psychiatry training programs to allow an enrolment of 11 to 12 residents annually.

Saskatchewan

Recommendation #47

Saskatchewan should increase the output of its residency program in psychiatry to an average of 7 annually if sufficient clinical experience can be provided for a training program of this size.

Manitoba

Recommendation #48

Manitoba should reduce its quota for residency positions in psychiatry to a level at which 1 to 2 residents enter the training program annually.

RADIATION ONCOLOGY

The projected requirement for radiation oncology will be satisfied by the current output of Western Canadian medical schools.

Western Canada

Recommendation #49

The western provinces should maintain their radiation oncology training programs at the current levels.

LABORATORY SPECIALISTS

The projected requirements for laboratory specialists over the next 20 years indicate that the number of people being trained in this group of specialties must be sharply increased. The specialties included in this group are general pathology, anatomical pathology, neuropathology, haematological pathology, medicial biochemistry, and medical microbiology.

Western Canada

Recommendation #50

The quota of residents entering these laboratory specialty programs in Western Canada should be increased by approximately 50% in 1983.

Recommendation #51

The western provinces should review the projected supply of specialists who will be certified in each of the laboratory specialties and focus future training efforts on the specialties in which practitioners are in the shortest supply.

British Columbia

Recommendation #52

British Columbia should maintain its current level of training for laboratory specialists.

Alberta

Recommendation #53

Alberta should increase the output of its training programs in the laboratory specialties to 9 to 10 annually.

Saskatchewan

Recommendation #54

Saskatchewan should increase the number of residents admitted to training programs in the laboratory specialties to approximately 5 annually.

Manitoba

Recommendation #55

The province of Manitoba should maintain its current training output for specialists in laboratory medicine.

SURGICAL SPECIALTIES: RECOMMENDATIONS

CARDIOVASCULAR AND THORACIC, THORACIC, AND VASCULAR SURGERY

On the basis of the Western Canada manpower requirements projected for surgeons in this group of specialties, the current output of specialists in these related areas is appropriate.

Recommendation #56

The western provinces should maintain the current levels of training in cardiovascular and thoracic, thoracic, and vascular surgery.

GENERAL SURGERY

The projected requirement for general surgeons in Western Canada for the next 20 years indicates that the quota of residents entering this program should be increased.

The aging of the present manpower supply of general surgeons combined with the restrictions on the scope of a surgeon's activities often related to aging may warrant further adjustments to the training recommendations.

Western Canada

Recommendation #57

On the basis of the annual training requirement for approximately 37 general surgeons to achieve the required supply by the year 2000, the intake of residents into these programs should be expanded by 50% across the western provinces.

British Columbia

Recommendation #58

British Columbia should significantly increase the number of general surgeons being trained; 10-14 residents should enter the program annually.

Alberta

Recommendation #59

Alberta should significantly increase the quotas for entrants into the general surgery programs to enable 12 to 16 residents to commence training annually.

Saskatchewan

Recommendation #60

Saskatchewan should consider a slight increase in its training output of general surgeons so that approximately 5 residents could complete the program annually.

Manitoba

Recommendation #61

Manitoba should reduce the level of its general surgery training program to approximately 6 entrants annually.

NEUROSURGERY

Given the identified requirements over the next 20 years for neurosurgeons, the training output of these specialists in western Canada should be reduced.

Recommendation #62

Taking due account of the effect that changes in the training quota will have on the small manpower supply, and recognizing the length of time required to train neurosurgeons, the western provinces should consider reducing the number of residents admitted to neurosurgical training programs to 1 to 2 annually.

OBSTETRICS AND GYNECOLOGY

Although a redistribution among the provinces of the training quota for obstetricians and gynecologists may be necessary, the overall current training output of these specialists in Western Canada is appropriate based on the projected requirements for the next two decades.

Western Canada

Recommendation #63

The current level of training for obstetricians and gynecologists should remain unchanged.

British Columbia

Recommendation #64

British Columbia should increase its current level of training for specialists in obstetrics and gynecology so that 6 to 7 residents complete training annually.

Alberta

Recommendation #65

Alberta should maintain the current quota governing the number of residents admitted to the obstetrics and gynecology programs.

Saskatchewan

Recommendation #66

Saskatchewan should continue to train obstetricians and gynecologists at the current level of output.

Manitoba

Recommendation #67

Manitoba should consider reducing the level of training provided in obstetrics and gynecology so that approximately one resident is admitted to the program annually.

OPHTHALMOLOGY

The role of ophthalmologists in the provision of eye care requires further definition. Nevertheless, the projected supply of these specialists will exceed the requirements by the year 2000 based on the service target ratio used to define manpower needs.

British Columbia

Recommendation #68

British Columbia should consider a reduction in its Ophthalmology training program so that approximately one resident completes training annually.

Alberta

Recommendation #69

Alberta should maintain its current quotas on residents in the Ophthalmology training program.

Saskatchewan

Recommendation #70

Saskatchewan should consider reducing the level of training in ophthalmology so that no more than one resident enters training annually. Alternatively, Saskatchewan may wish to explore the possibility of a joint program with an adjoining province.

Manitoba

Recommendation #71

Manitoba should reduce its quota for residents in the ophthalmology program to a level at which approximately one physician would be admitted for training annually.

ORTHOPEDIC SURGERY

The level of training output in orthopedic surgery must be sharply reduced to avoid an over-supply of these specialists by the year 2000.

Western Canada

Recommendation #72

Subject to consideration of the many factors influencing medical manpower requirements, it is recommended that the current training output of orthopedic surgeons in the western provinces be reduced by as much as 65% from its present output of approximately 13 annually.

British Columbia

Recommendation #73

British Columbia should consider reducing the quota for orthopedic surgery training positions so that one resident, on average, is admitted to the program annually.

Alberta

Recommendation #74

Alberta should reduce the number of residents entering the residency programs for orthopedic surgery to a level at which 3-4 residents complete training annually.

Saskatchewan

Recommendation #75

Saskatchewan should reduce the quota for residents in the program for orthopedic surgery so that approximately one resident completes training annually.

Manitoba

Recommendation #76

Manitoba should consider reducing the number of residents entering orthopedic surgery so that no more than one resident enters this training program annually.

PLASTIC SURGERY

Practitioners in plastic surgery tend to be relatively youthful, and most of them, therefore, will continue to practice over the next twenty years. Projected manpower requirements indicate that the training output of plastic surgery programs in western Canada should be reduced.

Western Canada

Recommendation #77

Giving due regard to the impact of training reductions, the western provinces should consider reducing the number of residents admitted to training programs in plastic surgery to 2 to 3 entrants annually.

UROLOGY

An increase in the number of training positions available in urology is necessary if the projected requirements for practitioners in this specialty are to be achieved through training.

Western Canada

Recommendation #78

The western provinces should increase the training output of the urology programs so that approximately 7 urologists complete training annually.

OTHER RECOMMENDATIONS

The preceding recommendations have focused primarily on changes in the size (intake and output) of the various medical training programs in the western provinces. The recommendations in this section are not training-oriented, but they should be considered by all four western provinces in conjunction with the recommendations made above.

GENERAL RECOMMENDATIONS APPLYING TO MEDICAL TRAINING ADJUSTMENTS

This section brings together several recommendations that apply generally to the proposed adjustments in training programs.

Controls on Physician Movement

It may not be appropriate for western provinces (in particular, British Columbia) to rely on the in-migration of physicians from other parts of Canada as a major source of the medical manpower needed to achieve the identified requirements. Neither is it appropriate to ignore the significant impact that physician migration has on the manpower supply and the training requirement of each province.

If the oversupply of physicians which has been projected for Canada in this and other studies develops, other western provinces may be affected by increased migration as the number of practitioners wishing to locate in areas of relative undersupply increases.

To achieve a balance between supply and requirements, provinces experiencing an influx of physicians may choose to establish long-term training goals, while controlling and directing the in-migration of physicians to meet short-

term manpower requirements or to remedy maldistribution. Controls on physicians wishing to relocate to another province and wanting to bill the provincial health services plan could include limitations as to the types and qualifications of physicians accepted or restriction as to areas within a province in which new physicians would be allowed to initiate practice.

It may be appropriate for the western provinces to further assess the factors which influence physician movement within Canada and to explore the feasibility of controlling the migration of medical manpower into areas where oversupplies are anticipated.

Recommendation #79

The need for controls over migration should be evaluated once the training output of medical programs elsewhere in Canada has been adjusted as a result of the recommendations of this and other recent reports.

Aging of Practitioners

The projections developed in this study suggest that significant oversupplies of physicians in certain specialty groups are developing in Western Canada. If these trends are to be reversed, severe reductions in the number of residents accepted into certain specialty programs will be necessary.

Such a reduction would result in an aging population of practitioners in those specialties in which training is cut back. This aging effect, in addition to the cyclical pattern of oversupply (leading to reduced training) followed by undersupply caused by attrition (leading to increased training) which may result, is undesirable.

The methodology which has been used to determine the appropriate level of residency training provides for an adjustment in these levels in 1983. To

ensure a balance in the supply and requirements for physicians by the year 2000, that level of adjusted training must be maintained until 1996 unless otherwise indicated.

The age distribution of the current practitioner supply is one rationale to be considered in determining the need for further adjustment. Such an adjustment would not affect the total number of residents admitted from 1983-1996, but would redistribute the residencies so that a greater portion of the admissions occur in a particular period in this 13 year age band. To facilitate analysis and comparison of the levels of training suggested in this report, the need for fluctuations in the output of specialists (over the 13 year period), has not been taken into consideration in developing the recommendations.

Recommendation #80

The age distribution by province of the practitioners in each of the specialties should be reviewed before finalizing adjustments in the quotas for training programs.

Recommendation #81

For certain long-established specialties in which the current provincial supply is aged, the provinces should consider adjusting the short-term output upward rather than planning to train the same number subsequent to the adjustments until the year 2000.

This aging trend is evident in the specialties of general surgery, internal medicine, obstetrics and gynecology, paediatrics and anaesthesia.

Interdependency of Graduate and Postgraduate Medical Programs

Medical students in the final years of their programs receive much of their training from residents in postgraduate programs. Medical educators believe that a certain number of core residency programs must be maintained to ensure that medical students in their clerkship years obtain the necessary experience. These programs include internal medicine, surgery, obstetrics and gynecology, paediatrics, and psychiatry.

Recommendation #82

In order to maintain the quality of graduate medical education programs, postgraduate programs in internal medicine, surgery, obstetrics and gynecology, paediatrics, and psychiatry should be maintained in all Western Canadian medical schools.

Viability of Residency Programs

Medical educators in Western Canada were consulted regarding the minimum number of residents that are needed in a given training program to ensure its viability. While residency positions involve both an educational and a service component, the number of residents required to provide services while in training was not explored at length.

To maintain high educational standards in a residency program, medical educators believed that each program should have a minimum of four residents which would allow one new resident to enter annually. They also pointed out that many excellent specialists have trained in programs where the quotas did not meet this standard.

In programs that will admit only one resident annually, the residents must participate fully in all aspects of training. Positions for persons accepted

into a program to conduct research or pursue other specialized activities should be provided from a separate quota rather than from a program quota particularly if the quota for the program in question has been reduced to the viable minimum.

Recommendation #83

Each residency program should admit at least one new resident annually to maintain its viability.

This guideline of one resident in each year of a given residency program applies to both specialties and subspecialties. Thus, for example, it is necessary to assign a quota sufficient to allow one resident annually to enter the subspecialties of gastroenterology, cardiology, respirology, biochemistry, orthopedic surgery and neurosurgery if these programs are to be offered at a medical school.

Shortages Within Subspecialties

In the analysis of manpower requirements, it was necessary to group a number of subspecialties due to the lack of supply data. As a result, the training recommendations developed for groups such as internal medicine specialties or laboratory specialties may not be sensitive to the requirements for individual subspecialties such as allergists or microbiologists.

Recommendation #84

Further analysis of the internal medicine and laboratory subspecialties is required to determine the appropriate focus and quota for these programs.

Dual Certification

A number of practitioners obtain certification (or train) in more than one specialty.

Recommendation #85

Postgraduate training quotas should be adjusted to ensure that sufficient residency positions are available for persons who are to pursue additional training.

IMPROVING THE DATA BASE

In order to improve the usefulness of the information base on physicians, the provinces should consider the following recommendations which address data shortcomings and data analysis requirements identified in Chapter I.

Uniformity of Data

Recommendation #86

The provinces should collaborate in establishing common procedures for classifying physicians by category, and formulating standardized quantitative and qualitative measures and uniform data collection methods so that valid interprovincial comparisons can be made.

Number and Activities of Fee-for-Service Physicians

Recommendation #87

To provide an accurate, current and comprehensive data base, physicians practicing in each province should be requested to complete a

standardized form to capture information on relocation, age, non fee-for-service activities, and so on. Physicians should complete this form when they re-apply annually for licenses.

Recommendation #88

The provinces should develop measures of fee-for-service practices (full-time/part-time) based on the gross fees received by practitioners in each specialty. These measures should be adjusted whenever changes are made in fee schedules.

The purpose of the above recommendation is to establish a realistic measure for determining the number of physicians conducting full-time fee-for-service practices in each specialty. Such a measure would also permit trends in part-time participation to be identified.

Non Fee-for-Service Medical Activities

Recommendation #89

So that the number and proportion of physicians engaged in non fee-for-service activities can be determined accurately, the provinces should explore ways of capturing and quantifying this information. The standardized form, proposed above, would be one means of collecting data.

Utilization Data on Medical Services

Recommendation #90

The provinces should consider requesting physicians to record the patient diagnosis as part of the billing submission in order to enable planners to analyze utilization data effectively.

Recommendation #91

The feasibility of standardizing certain key utilization variables should be considered so that basic interprovincial comparisons can be made.

Increased Use of Existing Data

Recommendation #92

The provinces' health planners should make more use of the data currently available to analyse manpower requirements, to evaluate the efficiency and effectiveness of the medical services provided, and to identify changing patterns in service delivery.

Such patterns may be useful in determining the appropriate balance between general practitioners and specialists, the desirable scope of practice for each specialty, and emerging changes in service patterns. These identified changes could indiciate a need to adjust the number of physicians training in a particular specialty.

Training Output

The shortcomings of the information concerning the output of residency training programs would be overcome if the following recommendation of the National Committee on Physician Manpower (1975) were implemented:

> "A register of residents training in each specialty [should] be established and kept current by the Royal College of Physicians and Surgeons of Canada".[2]

ONGOING MONITORING

The factors which could affect manpower supply (net migration, changing utilization, age of retirement, etc.) were taken into account in developing the net manpower requirements and, subsequently, the training recommendations for all physicians and each of the specialty groups.

Recommendation #93

Data on the factors affecting manpower supply should be collected and assessed by the provincial agencies responsible for these activities at intervals no greater than 5 years to determine the degree of variance from the number of physicians and specialists to be trained and should be adjusted in accordance with identified variances.

ALLOCATION OF TRAINING POSITIONS AMONG SPECIALTIES

The degree to which the funding bodies are involved in the development of residency training quotas for the various programs varies from province to province. In certain western provinces, the universities and the teaching hospitals develop the program quotas and reallocate positions within these quotas without receiving any input from manpower planners regarding future requirements.

Recommendations #94

Each of the western provinces should establish a committee or other mechanism which would enable the medical school(s), teaching hospitals, and the provincial funding agency to participate in the development of appropriate quotas for the residency training programs and to approve requests for reallocation of any positions between programs.

---

2 Vol. III, p.7.

Recommendation #95

Any training program which fails to attract its quota of residents over a period of several years should be examined in order to identify factors contributing to the shortfall.

PART-TIME PARTICIPATION

The current high level of part-time participation in fee-for-service medical practices in British Columbia may indicate a trend which could emerge in the remainder of Western Canada, given the oversupply of physicians projected for the next twenty years.

Recommendation #96

The other three western provinces should consider participating in a British Columbia study of the factors underlying the trend towards part-time participation. Factors which should be assessed include the effect of the practitioners' age on participation, the desire of practitioners to reduce the number of hours worked, and the inability of recent graduates, physicians who have relocated, and other physicians to attract enough patients to enable them to conduct full-time, fee-for-service practices.

INTERNSHIP REQUIREMENTS FOR GENERAL PRACTITIONERS

Increasingly, students who have completed their graduate medical education programs and who wish to function as general practitioners are enrolling in a two-year family practice residency program approved by the Canadian College of

Family Physicians. Alberta has supported this trend by requiring physicians to have completed a minimum of two years of training in an approved residency or internship program as a condition for licensure. In other provinces, a physician may still obtain a licence to practice upon completion of a one-year internship program.

This trend towards a two year internship as a minimum requirement has been supported by the literature and endorsed by many medical educators. Major urban hospitals (where the general practitioners have access to greater professional and technical support), require a 2 year residency as a condition for obtaining hospital privileges.

Recommendation #97

To encourage the establishment of certification by the Canadian College of Family Physicians as a requirement for physicians in general practice, British Columbia, Saskatchewan, and Manitoba should consider adopting the Alberta legislation which requires a graduate physician to complete a two-year residency or internship as a condition of licensure.

VII - INTER-RELATIONSHIP OF TRAINING RECOMMENDATIONS FOR OPTOMETRY AND OPHTHALMOLOGY

TABLE I: PROJECTED NET MANPOWER REQUIREMENTS

OPTOMETRIST AND OPHTHALMOLOGISTS - WESTERN CANADA

BY SCENARIO

		HISTORICAL POPULATION RATIO	SERVICE UTILIZATION APPROACH	SERVICE TARGET APPROACH
1985				
OPHTHALMOLOGISTS	NET	5	7	-35
OPTOMETRISTS	NET	65	84	235
1990				
OPHTHALMOLOGISTS	NET	-5	0	-50
OPTOMETRISTS	NET	91	117	275
2000				
OPHTHALMOLOGISTS	NET	-28	-10	-78
OPTOMETRISTS	NET	42	90	250

INTER-RELATIONSHIP OF TRAINING RECOMMENDATIONS FOR OPTOMETRY AND OPHTHALMOLOGY

INTRODUCTION

In report I-Optometry: - the Requirement for Alternative Training and Funding Arrangements in Western Canada, dated January, 1981, it was recommended that:

- "any decisions on the establishment of the school of optometry in western Canada be deferred until the completion of the study of ophthalmologists in Category V".

This study has now been completed, and this brief discussion has been prepared to review the recommendations for future training strategies for Optometrists in western Canada.

FINDINGS

Table I shows the projected net manpower requirements for optometrists and ophthalmologists under three scenarios. These are:

- historical population ratio;
- service utilization approach; and
- service target ratio approach.

The role and scope of practice of Optometry, Ophthalmology and Ophthalmic Dispensing requires further definition. At present the role of ophthalmology and optometry overlap in the provision of primary vision care. Optometrists count for approximately 65% of the refractions provided under government insured services. (This data is based on information obtained

from the Medical Insurance Programs in Alberta, Saskatchewan and Manitoba. Data was not available for British Columbia). Based on the projected stock throughout the forecast period this level of service will continue. It is estimated that under current training outputs, optometrists would account for approximately 65% of refractions performed in the year 2000.

Under the service target ratio of 1 optometrist per 10,000, and 1 ophthalmologist per 30,000 population, optometrists should account for 75% of the basic refraction performed.

FACTORS AFFECTING TRAINING RECOMMENDATIONS FOR OPTOMETRY

There is an immediate need for additional optometrists to offset an anticipated high rate of retirement in western Canada within the next ten years. After 1990, however, there is the potential for a limited surplus of optometrists in western Canada. Increased training will not solve the manpower requirements for the 1980's. Even if training intakes were increased immediately, the results would not be realized until the late 1980's because of the four year program time and the additional time required to establish and develop a practice. Consequently, the requirement for optometrists in western Canada in the 1980's will have to be met in other ways. This study has reviewed the need for a School of Optometry in western Canada, as an alternative to the current training agreements with the School of Optometry at the University of Waterloo, and the Province of Ontario. Based on a continuation of the existing method of providing primary vision care, the establishment of a School of Optometry is not justified.

Scenarios for Changing Service Patterns

At present the role and scope of practice of opthalmology and optometry overlap in the provision of primary vision care. There are two scenarios

which form the basis for determining the most appropriate training arrangements for optometrists in western Canada.

The first scenario assumes a continuation of the status quo in the provision of vision care. Under this scenario there is a minimal requirement for additional optometrists, and this does not justify the establishment of a School of Optometry in western Canada.

The second scenario is based on a redefinition of the role of the optometrist, ophthalmologist and ophthalmic dispenser in the provision of vision care services, which eliminates the overlap in functions of these occupations. This scenario would require a number of policy decisions and directions from the funding agencies and the limitation of payments for each level of practitioner for an appropriate range of services. Under this assumption it would be necessary to reduce the supply of ophthalmologists and increase the number of optometrists. In order to achieve an optimal manpower level for optometrists it would be necessary to train approximately 25-30 optometrists per year. This is the only scenario that would justify the establishment of a western Canada School of Optometry.

The redefinition of the role of each of the professions involved in vision care services has been widely discussed, and several provincial studies have been undertaken to review alternative approaches to the current system of vision care. To date, however, no decisions have been forthcoming from funding agencies on the future policy for vision care.

There are several inherent advantages in re-defining the roles for vision care. The major training advantage is that certain economies could result from the utilization of optometrists in primary vision testing. These economies would result from the reduced length of training for optometrists. The advantages from a health care delivery viewpoint are more difficult to determine as they involve judgements on the quality of care.

Recommendation #98

That, based on the continuation of the status quo in the provision of vision care services, no school of optometry be established in western Canada.

Recommendation #99

That the western provinces actively recruit optometrists from outside of western Canada during the 1980's, and provide financial incentives for practitioners to locate in under serviced areas.

Recommendation #100

That the provincial governments in western Canada undertake a review of the provision of vision care services to determine and develop policy directions to form the basis for future training strategies.

APPENDICES

APPENDICES

A. Notes on Factors Affecting Manpower Supply

B. Provincial Net Manpower Requirements

C. Control of Practice

D. Bibliography

APPENDIX A

NOTES ON FACTORS AFFECTING

MANPOWER SUPPLY

APPENDIX A

NOTES ON FACTORS AFFECTING MANPOWER SUPPLY

This Appendix provides the notes that apply to the factors shown in each exhibit entitled Factors Affecting Manpower Supply for the following specialties:

- Anaesthesia,
- Diagnostic Radiology,
- General Surgery,
- Internal Medicine,
- Laboratory Specialties,
- Obstetrics/Gynecology,
- Ophthalmology,
- Orthopaedic Surgery,
- Paediatrics,
- Psychiatry.

FACTORS

Net Migration:

British Columbia, Saskatchewan, Manitoba:
Interprovincial Migration of Physicians Reports (1978-80) prepared by Health and Welfare Canada based on data obtained from S.M.S. tapes. Data does not report each specialty separately. Net migration for each specialty was assumed to be proportionate to the number of practitioners in the individual specialty as compared with the total number of all Specialists.

Alberta:
Accurate information obtained from Physician Data Base (1978-80).

Net Immigration:

British Columbia, Saskatchewan, Manitoba:
Immigration information on the specialty under discussion was obtained from Immigration Tables by Specialty (1978-80) prepared by Health and Welfare Canada based on data obtained from S.M.S. tapes.

Emigration information on all specialists was obtained from Active Physicians who Moved Abroad (1978-80) prepared by Health and Welfare Canada based on S.M.S. data. Immigration estimates for each specialty were developed through apportionment based on number in active stock.

Alberta:
Accurate information obtained from Physician Data Base (1978-80).

Net Occupational Shift:

Data suggests that shifts within medical specialties are insignificant.

Training Output:

Based on the current theoretical output of residents from each of the 5 medical schools. Data was obtained and confirmed by the Assistant Dean of Postgraduate Medicine of each school. Projections assume that all residents receive certification and initiate practice in the province where they received training.

The number of residents in a program at any given time may vary from the quota. A further explanation of these variances is provided in the separate report titled: "Physicians: The Scope of Existing Training Programs".

Attrition:

Based on data obtained from the respective Colleges of Physicians and Surgeons of each province.

General Comment:

The validity of the projections which have been made for net migration and immigration is questionable. This is due to the need to apportion figures from the pool of specialists to each specialty group and the significant variance in the three years of historical data on which the projections were based.

Should these projections not accord with future trends, the cumulative effect of the variance will be significant over the 20-year period.

APPENDIX B

PROVINCIAL NET MANPOWER REQUIREMENTS

APPENDIX B

TABLE OF CONTENTS

	Page
GENERAL ASSUMPTIONS	B-1
METHODOLOGY FOR CALCULATING REQUIREMENTS	B-2
SENSITIVITY ANALYSIS	B-4
PROVINCIAL ASSUMPTIONS	B-6
British Columbia	B-6
Alberta	B-8
Saskatchewan	B-10
Manitoba	B-12

EXHIBITS		Opposite Page	Following Page
B-1	Total Number of Physicians in Western Canada	B-1	
B-2	Factors Affecting Manpower Supply Physicians, Western Canada		B-1
B-3	Sensitivity Analysis Total Number of Physicians Required in Western Canada	B-5	
B-4	Number of Physicians in British Columbia 1979, 1980	B-6	
B-5	Age Distribution of All Physicians for British Columbia		B-6
B-6	Factors Affecting Manpower Supply Physicians, British Columbia		B-6
B-7	Manpower Requirements, Physicians, British Columbia	B-7	
B-8	Number of Physicians in Alberta, 1978, 1979, 1980	B-8	
B-9	Age Distribution of All Physicians for Alberta		B-8
B-10	Factors Affecting Manpower Supply, Physicians, Alberta		B-8

EXHIBITS, continued

	Opposite Page	Following Page
B-11 Manpower Requirements, Physicians Alberta	B-9	
B-12 Number of Physicians in Saskatchewan, 1978, 1979, 1980	B-10	
B-13 Age Distribution of All Physicians for Saskatchewan		B-10
B-14 Factors Affecting Manpower Supply, Physicians, Saskatchewan		B-10
B-15 Manpower Requirements, Physicians, Saskatchewan	B-11	
B-16 Number of Physicians in Manitoba, 1978, 1979, 1980	B-12	
B-17 Age Distribution of All Physicians for Manitoba		B-12
B-18 Factors Affecting Manpower Supply		B-12
B-19 Manpower Requirements, Physicians, Manitoba	B-13	

EXHIBIT B-1

TOTAL NUMBER OF PHYSICIANS IN WESTERN CANADA

Year	British Columbia[1]	Alberta[2]	Saskatchewan[3]	Manitoba[4]	Total
1978	-	2,714	1,250	1,636	-
1979	4,817	2,759	1,273	1,612	10,461
1980	5,037	2,898	1,307	1,647	10,889

Sources:

[1]Roll Call 79 and Roll Call Update 80. Based on information obtained from the College of Physicians and Surgeons of British Columbia.

[2]Alberta Physician Data Bank as reported in Health and Social Services Manpower in Alberta: 1980.

[3]Saskatchewan Medical Association as reported in S17A Monthly Report: Physicians in Saskatchewan by Field of Practice, by Method of Payment based on information obtained from the College of Physicians and Surgeons of Saskatchewan.

[4]Manitoba Health Manpower Provincial Reports, based on information obtained from the College of Physicians and Surgeons of Manitoba.

APPENDIX B

GENERAL ASSUMPTIONS

Exhibit B-1, opposite, shows the recent historical trend in physician manpower in Western Canada. These figures reflect the number of physicians who were active in their respective provinces as identified by the sources noted on the Exhibit.

Where possible, the historical data provided by the Colleges of Physicians and Surgeons has been compared with the data provided by provincial government sources. Discrepancies were explored and reconciled as far as possible.

Supply Assumptions

The general assumptions made with respect to each of the factors which have the potential to affect manpower supply are shown in Exhibit B-2, overleaf.

- Opening stock - the number of physicians identified in Exhibit B-1.
- Net migration - expressed as a constant value throughout the projection period. The assumption was based on historical migration.
- Net occupational shift - defined as 0, as physicians can remain registered as active with their respective colleges even if they are not actively conducting a practice.
- Training output - the number of planned graduates as projected by the respective medical schools in each province. It has been assumed that attrition will remain constant.

EXHIBIT B-2

FACTORS AFFECTING MANPOWER SUPPLY
PHYSICIANS, WESTERN CANADA

Factor	British Columbia	Alberta	Saskatchewan	Manitoba
Opening Stock (1980)	5,037	2,898	1,307	1,647
Net Migration	80	30	-25	-25
Net Immigration	8	15	5	15
Net Occupational Shift	0	0	0	0
Training Output	1981-83: 91(ave) 1984 + : 115	179	60	90
Attrition	Current age distribution and assumed retirement at age 65.	See B.C.	See B.C.	See B.C.

Notes:

British Columbia: see notes on Exhibit B-6

Alberta: see notes on Exhibit B-10

Saskatchewan: see notes on Exhibit B-14

Manitoba: see notes on Exhibit B-18

- Attrition - the distribution of active physicians by age cohort was utilized to reduce the supply of physicians by an appropriate number annually based on the total number in each age cohort. The age of retirement was assumed to be 65.

METHODOLOGY FOR CALCULATING MANPOWER REQUIREMENTS

Historical (Population) Ratio

The historical (population) ratio, that is, the present relationship between the number of physicians and the population, was applied to the future population which was projected for Western Canada until the year 2000.

The result indicates the number of physicians required in the future, assuming that the current ratio is appropriate and that population growth is the sole factor which affects manpower requirements.

Utilization Method

The utilization method assumes that the current ratio of physicians to population is appropriate, as does the historical ratio. However, this method also takes into consideration demographic change in determining future physician manpower requirements.

Through a comparison of these two projections, the anticipated effect of aging and other demographic factors was identified. The results are shown in Exhibit II-4, and discussed on pages II-5 and II-6 in Chapter II.

A summary of the methodology which was employed in calculating the projections using the utilization method follows.

Utilization data for all physicians and for each of the specialty groups were obtained to assess the effect of changing demographics on the requirements for physicians.

Data on the age and sex of the patient treated by each specialty group were obtained from the four western provinces. Similar utilization data on all Physicians (as a single group) was obtained from British Columbia and Alberta. For Saskatchewan and Manitoba, the relative incidence of utilization for each age/sex cohort, based on the Alberta data, was applied to the current populations, the current number of physicians, and the future projected populations to determine the number of physicians required for the future populations of these two provinces.

The number of currently active physicians by province was assumed to be the number required to service the provincial populations. This assumption was made in the analysis conducted for all physicians, general practitioners/family physicians, and the ten major specialties.

The incidence of services for each age and sex cohort was applied to the future populations which were projected for those cohorts in the future.

The total volume of services projected for the future population was compared with the current actual services provided by the physician group in question to determine the number of physicians in the group required in the future.

By comparing the projection developed from applying the historical ratio (which projects the effect of population growth) and the utilization projection (which combines the effects of population growth and demographic change), it was possible to identify the effects of changes in the age and sex of the population on physician requirements. An example of how these two factors may be isolated is provided for the group All Physicians in Exhibit II-4 and on page II-6 in Chapter II.

Service Target Ratio

The service target ratio establishes the desirable ratio of manpower to population. Such ratios have been developed for physicians and the various specialties within medicine in Canadian and foreign studies carried out by government agencies, manpower planners, and individual physicians.

Methods which have been used to derive appropriate service target ratios for physicians include Delphi panels, quantitative analyses of utilization data and historical trends, assessment of the number of physicians involved in non-fee-for-service activities, and reviews of technological developments.

Many previous physician manpower planning initiatives have utilized service target ratios as their primary means for determining current and future requirements. In this study, a similar strategy has been adopted, as the service target ratios are widely accepted as the most appropriate method of projecting future physician requirements.

The service target ratios which were developed as guidelines in the McKendry Report have been heavily utilized in this study as a primary source of service target ratios.

SENSITIVITY ANALYSIS

Certain factors that affect net manpower requirements are more predictable than others. These factors are analysed below.

The National Committee on Physician Manpower (1975) found that the average workweek of a full-time fee-for-service physician is 48 hours. Physicians are attempting to reduce their working time so that their hours will be more comparable with those of other professions.

EXHIBIT B-3

SENSITIVITY ANALYSIS

TOTAL NUMBER OF PHYSICIANS REQUIRED IN WESTERN CANADA

YEAR	NET MANPOWER REQUIREMENTS												Western Canada Total		
	British Columbia			Alberta			Saskatchewan			Manitoba					
	Official Proj.[1]	+10%[2]	+20%[3]	Official Proj.[1]	+10%[2]	+20%[3]	Official Proj.[1]	+10%[2]	+20%[3]	Official Proj.[1]	+10%[2]	+20%[3]	Official Proj.[1]	+10%[2]	+20%[3]
1990	5,030	5,533	6,036	4,488	4,937	5,386	1,756	1,932	2,107	1,785	1,964	2,142	13,059	14,366	15,671
2000	5,762	6,338	6,914	5,531	6,084	6,637	1,950	2,145	2,340	1,873	2,060	2,248	15,116	16,628	18,139

Notes:

1. The official projection of physician manpower requirements is based on the service target ratio of 1:630 as recommended by the National Committee on Physician Manpower.
2. To determine the possible effect of reductions in the hours of work and productivity the requirements for physicians has been increased by 10%. This increase results in a service target ratio of 1:573.
3. The third column analyses the effects of a 20% increase in physician requirements. This 20% increase would result in a service target ratio of 1:525.

Another factor which may affect the supply of physician services is the increasing numbers of women who are entering the medical field. One Quebec study showed that "the production of women in full-time practice is about 30% less than that of men, and their lifetime productivity is 20 to 30% less."[1] Similarly, an American study has indicated that "female physicians average 68% of the hours worked by male physicians over a professional lifetime."[1]

The number of patient services that a practitioner performs in a given time has increased significantly since the introduction of health insurance for all Canadians. This increase has been in part due to trends towards more efficient practice modes such as group practice. It is also due to less time being spent with each patient. Given the relatively small increases in their fee schedules, physicians have increased the number of patients they see as one method of maintaining their relative income levels.

It is unlikely that further increases in the hourly productivity of physicians can be achieved. Rather the future may see a reversal in the trend towards greater productivity as provincial medical plans develop mechanisms to reward practitioners for providing preventive health services (which should reduce demand for services in the long run), as a higher proportion of physicians accept salaried positions, as patient expectations increase, and as physicians respond to greater competition by providing more comprehensive services to each patient.

These three interrelated factors (reduced working hours, the increasing number of women, and reduced hourly productivity) may result in a decrease in the effective supply of physicians in the future which would necessitate an increase in the number of physicians by 10-20%. The effect of a 10% and a 20% increase on the requirements for physicians is summarized in Exhibit B-3, opposite.

1. CMA Journal, August 1976, V. 115, P.267.

Because the eventual effect which these factors will have on the requirements for physicians is highly uncertain, the possible trends which have been projected in Exhibit B-3 have not been formally incorporated in this study's analyses of manpower requirements. However, the National Committee on Physician Manpower report provides a service target ratio for physician requirements ranging from 1:665 to 1:630. In anticipation of the effect of the trends identified above, the service target ratio adopted in this report to define the overall physician manpower requirement in Western Canada is 1:630.

The uncertainty surrounding the affect that these and other factors will have on the future requirements for physician manpower underscores the need for periodic re-evaluation of the data and re-adjustment of the training outputs.

EXHIBIT B-4

NUMBER OF PHYSICIANS IN BRITISH COLUMBIA, 1979, 1980

Year	Roll Call 79 Roll Call Update 80
1979	4,817
1980	5,037

Sources:

Roll Call data based on information received from the College of Physicians and Surgeons of British Columbia.

Only Direct Active Physicians are included; interns and residents are excluded.

Data is updated regularly and is assumed to be accurate.

PROVINCIAL ASSUMPTIONS

The assumptions made in estimating the manpower supply and requirements for each province are detailed below.

BRITISH COLUMBIA

Legal Controls

Only persons registered under the Medical Practitioners Act of British Columbia and who are not suspended from practice are entitled to practice medicine, surgery or midwifery in the Province.

The licensing requirements are shown in Appendix C, Control of Practice.

Assumptions

Manpower Stock

Exhibit B-4, opposite, shows the total number of Physicians registered in British Columbia. The age distribution of British Columbia Physicians is shown in Exhibit B-5, overleaf.

Factors Affecting Manpower Supply

The assumption made with respect to each of the factors which could effect manpower stock are shown in Exhibit B-6, overleaf. These factors include migration, immigration, occupational shifts, training output, and attrition. The information source for each assumption is identified.

EXHIBIT B-5

AGE DISTRIBUTION OF ALL PHYSICIANS

FOR BRITISH COLUMBIA

AGE GROUP	TOTAL	
	#	%
20 - 24	227	4.5
25 - 29	227	4.5
30 - 34	851	16.9
35 - 39	851	16.9
40 - 44	572	11.4
45 - 49	572	11.4
50 - 54	526	10.4
55 - 59	526	10.4
60 - 64	274	5.4
65+	411	8.2
TOTAL	5,037	100%

EXHIBIT B-6

FACTORS AFFECTING MANPOWER SUPPLY

PHYSICIANS, BRITISH COLUMBIA

Factor	Assumption	Source
Opening Stock	5,037	Roll Call Update 80
Net Migration	80	Health and Welfare
Net Immigration	10	Health and Welfare
Net Occupational Shift	0	C. of P.S. of B.C.
Training Output	1981-83: 91(ave) 1984 + : 115	U.B.C. Medical School
Attrition	Current age distribution and assumed retirement at age 65.	U.B.C. Health Manpower Research Unit

Notes:

Opening Stock:

See notes on Exhibit B-4.

Net Migration:

The Health Information Division of Health and Welfare Canada purchases computer tapes from Sales Management Systems, (S.M.S.).

The number of active physicians (excluding interns and residents) migrating into and out of each province has been identified through comparing the information from year to year.

The figure for net migration was obtained by averaging the data reported for the preceding 3 years. It is assumed that this data provides a reasonably accurate estimate of historical movement.

Net Immigration:

The Health Information Division (Health and Welfare) utilizes the S.M.S. computer tapes to prepare 2 reports:

EXHIBIT B-6, continued

- Immigration Tables by Specialty,
- Active Civilian Physicians Who Moved Abroad.

The net immigration calculated from these reports was averaged for the preceding 3 years to obtain the figure reported above.
It is assumed that this data provides a reasonably accurate estimate of historical immigration and emigration.

Net Occupational Shift:

Based on the comments of the College of Physicians and Surgeons, net occupational shift is assumed to be 0.

Training Output:

Based on the current enrolment less the historical attrition, as reported by the School of Medicine.

Attrition:

Data obtained for June 1981 was superimposed on 1980 opening stock. It is assumed that this approach produced an accurate projection of the year in which each physician will reach age 65.

General Comment:

Although the net migration and immigration data are accurate, significant variances occurred over the 3 years analyzed. If the future trends projected based on these historical data are incorrect, the cumulative effect of this error over the 20-year period may be significant.

EXHIBIT B-7

MANPOWER REQUIREMENTS

PHYSICIANS, BRITISH COLUMBIA

Projected Manpower Requirements										
Year	Projected Stock	Population Approach 1:521 Low	Medium	High	Utilization Low	Medium	High	Service Target 1:630 Low	Medium*	High
1981	5073	5080	5129	5175	5086	5144	5199	4207	4244	4280
	NET	9	58	104	15	73	128	-866	-829	-793
1982	5109	5156	5229	5286	5165	5249	5317	4275	4332	4376
	NET	51	124	181	60	144	212	-834	-777	-733
1983	5152	5232	5329	5398	5243	5353	5437	4345	4420	4474
	NET	86	183	252	97	207	291	-807	-732	-678
1984	5217	5307	5427	5510	5315	5452	5551	4414	4508	4573
	NET	98	218	301	106	243	342	-803	-709	-644
1985	5282	5380	5526	5624	5381	5545	5661	4483	4597	4674
	NET	108	254	352	109	273	389	-799	-685	-608
1990	5757	5749	6022	6202	5664	5958	6163	4816	5030	5171
	NET	91	262	375	81	272	405	-941	-727	-586
1995	6232	6055	6454	6725	5866	6272	6563	5108	5420	5633
	NET	-147	252	523	-336	70	361	-1124	-812	-599
2000	6707	6332	6845	7211	6138	6648	7022	5359	5762	6050
	NET	-335	178	544	-529	-19	355	-1348	-945	-657

Note: The asterisked column (*) represents the most likely scenario for this occupation in British Columbia.

Calculation of Requirements

The historical ratio, that is, the current ratio of Physicians to population, 1:521, was used to project the number of practitioners required in the future to maintain the current level of manpower.

Utilization data differentiating the age and sex of patients treated was utilized to project the increase in the volume of services and the number of Physicians required to provide services to the future population.

A service target ratio of 1:630 was used based on the recommendations of the McKendry report.

Net Manpower Requirements

Exhibit B-7, opposite, shows the projected manpower requirements under each projection approach. The most likely scenario is based on the service target ratio of 1:630 under the medium population projection.

EXHIBIT B-8

NUMBER OF PHYSICIANS IN ALBERTA, 1978, 1979, 1980

Year	Health and Social Services in Alberta, 1978, 79, 80
1978	2,714
1979	2,759
1980	2,898

Notes: Data presented in Health and Social Services in Alberta reports obtained from the Alberta Physician Data Base.

Persons enrolled in internship or residency programs are excluded.

Data is updated annually and is assumed to be accurate.

ALBERTA

Legal Controls

A practitioner registered under the Medical Profession Act who is not under suspension is entitled to practice in Alberta in any class of practice in respect of which he is registered.

The licensing requirements are shown in Appendix C, Control of Practice.

Assumptions

Manpower Stock

Exhibit B-8, opposite, shows the total number of Physicians registered in Alberta. The age distribution of Alberta Physicians is shown in Exhibit B-9, overleaf.

Factors Affecting Manpower Supply

The assumption made with respect to each of the factors which could affect manpower stock are shown in Exhibit B-10, overleaf. These factors include migration, immigration, occupational shifts, training output, and attrition. The information source for each assumption is identified.

Calculation of Requirements

The historical ratio, that is, the current ratio of Physicians to population, 1:720, was used to project the number of practitioners required in the future to maintain the current level of manpower.

EXHIBIT B-9

AGE DISTRIBUTION OF ALL PHYSICIANS

FOR ALBERTA

AGE GROUP	TOTAL	
	#	%
20 - 24	-	-
25 - 29	170	5.8
30 - 34	464	15.8
35 - 39	479	16.3
40 - 44	370	12.6
45 - 49	383	13.0
50 - 54	387	13.2
55 - 59	294	10.0
60 - 64	222	7.6
65+	167	5.7
TOTAL	2,936	100%

EXHIBIT B-10

FACTORS AFFECTING MANPOWER SUPPLY

PHYSICIANS, ALBERTA

Factor	Assumption	Source
Opening Stock	2,898	Physician Data Bank
Net Migration	35	Physician Data Bank
Net Immigration	15	Physician Data Bank
Net Occupational Shift	0	C. of P.S. of Alberta
Training Output	179	U. of A. and U. of C. Medical Schools
Attrition	Current age distribution and assumed retirement at age 65.	Physician Data Bank

Notes:

Opening Stock:

See notes on Exhibit B-8.

Net Migration and Immigration:

The Alberta Physician Data Bank reports identify:

- Physicians Immigrating to Alberta,
- Physicians Emigrating from Alberta.

It is assumed that this information which identifies the former residence of Physicians arriving and the destination of Physicians leaving is accurate.

The figures identified above have been obtained by averaging the movements reported in 1978, 1979 and 1980.

Net Occupational Shift:

Based on the comments of the College of Physicians and Surgeons, net occupational shift is assumed to be 0.

EXHIBIT B-10, continued

Training Output:

Based on the current enrolment less the historical attrition as reported by the Schools of Medicine.

Attrition:

Age distribution obtained from Data Bank for May 1981 was superimposed on 1980 opening stock. It is assumed that the resulting age distribution is accurate.

General Comment:

Although the net migration and immigration data are accurate, significant variances occurred over the 3 years analyzed. If the future trends projected based on these historical data are incorrect the cumulative effect of this error over the 20 year period may be significant.

EXHIBIT B-11

MANPOWER REQUIREMENTS

PHYSICIANS, ALBERTA

Projected Manpower Requirements									
Year	Projected Stock	Population Approach 1:719			Utilization			Service Target 1:630		
		Low	Medium	High	Low	Medium	High	Low	Medium*	High
1981	3044	2962	2999	3024	2970	3099	3038	3378	3420	3448
	NET	-82	045	-20	-74	-35	-6	334	376	404
1982	3190	3037	3114	3128	3054	3126	3149	3464	3552	3568
	NET	-153	-76	-62	-136	-64	-41	274	362	378
1983	3336	3111	3237	3236	3133	3249	3261	3547	3692	3690
	NET	-225	-99	-100	-203	-87	-75	211	356	354
1984	3482	3181	3353	3349	3209	3364	3377	3628	3824	3819
	NET	-301	-129	-133	-273	-118	-105	146	342	337
1985	3628	3250	3454	3465	3285	3471	3499	3706	3939	3951
	NET	-378	-174	-163	-343	-157	-129	78	311	323
1990	4448	3566	3935	4069	3640	3964	4089	4067	4488	4641
	NET	-882	-513	-379	-808	-484	-359	-381	40	193
1995	5183	3854	4398	4681	3971	4427	4668	4395	5016	5339
	NET	-1329	-785	-502	-1212	-756	-515	-788	-167	156
2000	5918	4124	4850	5294	4319	4918	5285	4704	5531	6038
	NET	-1794	-1068	-624	-1599	-1000	-633	-1214	-387	120

Note: The asterisked column (*) represents the most likely scenario for this occupation in Alberta.

Utilization data differentiating the age and sex of patients treated was used to project the increase in the volume of services and the number of physicians required to provide services to the future population.

A service target ratio of 1:630 was used based on the recommendations of the McKendry report.

Net Manpower Requirements

Exhibit B-11, opposite, shows the projected manpower requirements under each projection approach. The most likely scenario is based on the service target ratio of 1:630 under the medium population projection.

EXHIBIT B-12

NUMBER OF PHYSICIANS IN SASKATCHEWAN, 1978, 1979, 1980

Year	Saskatchewan Medical Association
1978	1,250
1979	1,273
1980	1,307

Notes:

Saskatchewan Medical Association data are presented in their S.M.A. Monthly Report: Physicians in Saskatchewan by Field of Practice, by Method of Payment, based on information obtained from the College of Physicians and Surgeons of Saskatchewan.

Persons enrolled in internship or residency programs are excluded.

Data presented above is from the respective December 31 reports and is assumed to be accurate.

SASKATCHEWAN

Legal Controls

Every person registered under the Act respecting the Medical Profession and not under suspension is entitled to practice in Saskatchewan within any restrictions, limitations, or conditions fixed by the College on the services that he may provide.

The licensing requirements are shown in Appendix C, Control of Practice.

Assumptions

Manpower Stock

Exhibit B-12, opposite, shows the total number of Physicians registered in Saskatchewan. The age distribution of Saskatchewan Physicians is shown in Exhibit B-13, overleaf.

Factors Affecting Manpower Supply

The assumption made with respect to each of the factors which have the potential to affect manpower stock are shown in Exhibit B-14, overleaf. These factors include migration, immigration, occupational shifts, training output, and attrition. The information source for each assumption is identified.

Calculation of Requirements

The historical ratio, that is, the current ratio of Physicians to population, 1:738, was used to project the number of practitioners required in the future to maintain the current level of manpower.

EXHIBIT B-13

AGE DISTRIBUTION OF ALL PHYSICIANS

FOR SASKATCHEWAN

AGE GROUP	TOTAL	
	#	%
20 - 24	83	8.7
25 - 29	82	8.6
30 - 34	83	8.7
35 - 39	19	2.0
40 - 44	20	2.1
45 - 49	186	19.5
50 - 54	186	19.5
55 - 59	113	11.8
60 - 64	114	11.9
65+	69	7.2
TOTAL	955	100%

EXHIBIT B-14

FACTORS AFFECTING MANPOWER SUPPLY

PHYSICIANS, SASKATCHEWAN

Factor	Assumption	Source
Opening Stock	1,307	Sask. Medical Association
Net Migration	-25	Health and Welfare
Net Immigration	5	Health and Welfare
Net Occupational Shift	0	C. of P.S. of Sask.
Training Output	60	University of Saskatchewan Medical School
Attrition	Current age distribution and assumed retirement at age 65.	S.M.C.I.C.

Notes:

Opening Stock:

See notes on Exhibit B-12.

Net Migration:

The Health Information Division of Health and Welfare Canada purchases computer tapes from Sales Management Systems, (S.M.S.). The number of active physicians (excluding interns and residents) migrating into and out of each province has been identified as a result of comparison of the information from year to year. The figure for net migration was obtained by averaging the data reported for the preceding 3 years. It is assumed that this data provides a reasonably accurate estimate of historical movement.

Net Immigration:

The Health Information Division (Health and Welfare) utilizes the S.M.S. computer tapes to prepare 2 reports:

EXHIBIT B-14, continued

- Immigration Tables by Specialty,
- Active Civilian Physicians Who Moved Abroad.

The net immigration calculated from these reports was averaged for the preceding 3 years to obtain the figure reported above.
It is assumed that this data provides a reasonably accurate estimate of historical immigration and emigration.

Net Occupational Shift:

Based on the comments of the College of Physicians and Surgeons, net occupational shift is assumed to be 0.

Training Output:

Based on the current enrolment less the historical attrition as reported by the School of Medicine.

Attrition:

The Saskatchewan Medical Care Insurance Commission 1980 Annual Report differentiated physicians by age using 10-year age groupings. As only 927 of the 1,307 active physicians are captured in their report, it was necessary to extrapolate their findings to the total number of active physicians. It is assumed that this approach has resulted in a reasonably accurate estimate of the ages of Saskatchewan Physicians.

General Comment:

Although the net migration and immigration data are accurate, significant variances occurred over the 3 years analyzed. If the future trends projected based on these historical data are incorrect, the cumulative effect of this error over the 20-year period may be significant.

EXHIBIT B-15

MANPOWER REQUIREMENTS

PHYSICIANS, SASKATCHEWAN

Projected Manpower Requirements										
Year	Projected Stock	Population Approach 1:738			Utilization			Service Target 1:630		
		Low	Medium	High	Low	Medium	High	Low	Medium*	High
1981	1318	1319	1323	1363	1327	1329	1371	1546	1551	1597
	NET	1	5	45	9	11	53	228	233	279
1982	1329	1333	1342	1389	1348	1353	1404	1562	1573	1628
	NET	4	13	60	19	24	75	233	244	299
1983	1340	1346	1362	1416	1366	1377	1434	1577	1596	1660
	NET	6	22	76	26	37	94	237	256	320
1984	1351	1359	1382	1444	1383	1400	1465	1592	1620	1692
	NET	8	31	93	32	49	114	241	269	341
1985	1362	1372	1402	1473	1401	1423	1497	1607	1643	1726
	NET	10	40	111	39	61	135	245	281	364
1990	1412	1429	1499	1622	1469	1528	1645	1674	1756	1901
	NET	17	78	190	56	107	215	260	332	464
1995	1427	1469	1585	1773	1510	1612	1781	1722	1858	2077
	NET	42	158	346	83	185	354	295	431	650
2000	1437	1497	1664	1923	1544	1694	1929	1754	1950	2253
	NET	60	227	486	107	257	492	317	513	816

Note: The asterisked column (*) represents the most likely scenario for this occupation in Saskatchewan.

Utilization data differentiating the age and sex of patients treated was used to project the increase in the number of physicians that may be required to provide services to the projected Saskatchewan population.

A service target ratio of 1:630 was used based on the recommendations of the National Committee on Physician Manpower (1975).

Net Manpower Requirements

Exhibit B-15, opposite, shows the projected manpower requirements under each projection approach. The most likely scenario is based on the service target ratio of 1:630 under the medium population projection.

EXHIBIT B-16

NUMBER OF PHYSICIANS IN MANITOBA, 1978, 1979, 1980

Year	Health Manpower Provincial Report
1978	1,636
1979	1,612
1980	1,647

Notes:

Manitoba Health Manpower Provincial Reports, based on information obtained from the College of Physicians and Surgeons of Manitoba, include all members resident in province, in good standing, and entitled to practice. Persons enrolled in internship or residency programs are excluded.

Information is updated annually and is assumed to be accurate.

MANITOBA

Legal Controls

No person shall practice medicine in Manitoba unless he holds a current license to practice, and then only to such extent as is defined in or authorized by the license.

The licensing requirements are shown in Appendix C, Control of Practice.

Manpower Stock

Exhibit B-16, opposite, shows the total number of Physicians registered in Manitoba. The age distribution of Manitoba Physicians is shown Exhibit B-17, overleaf.

Factors Affecting Manpower Supply

The assumption made with respect to each of the factors which could affect manpower stock are shown in Exhibit B-18, overleaf. These factors include migration, immigration, occupational shifts, training output, and attrition. The information source for each assumption is identified.

Requirements Methodology

The historical ratio, that is the current ratio of Physicians to population, 1:640, was used to project the number of practitioners required in the future to maintain the current level of manpower.

Utilization data differentiating the age and sex of patients treated was used to project the increase in the number of Physicians that may be required to provide services to the projected Manitoba population.

EXHIBIT B-17

AGE DISTRIBUTION OF ALL PHYSICIANS

FOR MANITOBA

AGE GROUP	TOTAL	
	#	%
20 - 24	-	-
25 - 29	133	7.8
30 - 34	265	15.6
35 - 39	234	13.7
40 - 44	195	11.5
45 - 49	198	11.6
50 - 54	204	12.0
55 - 59	199	11.7
60 - 64	139	8.2
65+	135	7.9
TOTAL	1,702	100%

EXHIBIT B-18

FACTORS AFFECTING MANPOWER SUPPLY

PHYSICIANS, MANITOBA

Factor	Assumption	Source
Opening Stock	1,647	Health Manpower Prov. Report
Net Migration	-25	Health and Welfare
Net Immigration	15	Health and Welfare
Net Occupational Shift	0	C. of P.S. of Manitoba
Training Output	90	U. of Manitoba Medical School
Attrition	Current age distribution and assumed retirement at age 65.	

Notes:

Opening Stock:

See notes on Exhibit B-16.

Net Migration:

The Health Information Division of Health and Welfare Canada purchases computer tapes from Sales Management Systems, (S.M.S.).

The number of active physicians (excluding interns and residents) migrating into and out of each province has been identified through comparing the information from year to year.

The figure for net migration was obtained by averaging the data reported for the preceding 3 years. It is assumed that this data provides a reasonably accurate estimate of historical movement.

Net Immigration:

The Health Information Division (Health and Welfare Canada) utilizes the S.M.S. computer tapes to prepare 2 reports:

EXHIBIT B-18, continued

- Immigration Tables by Specialty,
- Active Civilian Physicians Who Moved Abroad.

The net immigration calculated from these reports was averaged for the preceding 3 years to obtain the figure reported above.
It is assumed that this data provides a reasonably accurate estimate of historical immigration and migration.

Net Shift:

Based on the comments of the College of Physicians and Surgeons, net occupational shift was assumed to be 0.

Training Output:

Based on the current enrolment less the historical attrition as reported by the School of Medicine.

Attrition:

Based on information obtained from a survey conducted of active members of the College of Physicians and Surgeons in June 1981. It is assumed that superimposition of the age distributions reported onto the 1980 opening stock has resulted in a reasonably accurate estimate.

General Comments:

Although the net migration and immigration data are accurate, significant variances occurred over the 3 years analyzed. If the future trends projected based on these historical data are incorrect, the cumulative effect of this error over the 20 year period may be significant.

As it was not possible to obtain the above information from a single source, it was necessary to use information derived from the various sources identified above.

EXHIBIT B-19

MANPOWER REQUIREMENTS

PHYSICIANS, MANITOBA

Projected Manpower Requirements										
Year	Projected Stock	Population Approach 1:640			Utilization			Service Target 1:630		
		Low	Medium	High	Low	Medium	High	Low	Medium*	High
1981	1672	1647	1659	1661	1647	1667	1669	1673	1686	1688
	NET	-25	-13	-11	-25	-5	-3	1	14	16
1982	1697	1657	1668	1674	1662	1683	1689	1684	1695	1701
	NET	-40	-29	-23	-35	-14	-8	-13	-2	4
1983	1722	1668	1678	1688	1678	1699	1707	1695	1706	1715
	NET	-54	-44	-34	-44	-23	-15	-27	-16	-7
1984	1747	1680	1689	1702	1694	1715	1726	1707	1717	1730
	NET	-67	-58	-45	-53	-32	-21	-40	-30	-17
1985	1772	1691	1701	1716	1712	1732	1745	1719	1728	1743
	NET	-81	-71	-56	-60	-40	-27	-53	-44	-29
1990	1972	1745	1757	1782	1786	1807	1829	1773	1785	1811
	NET	-227	-215	-190	-186	-165	-143	-199	-187	-161
1995	2172	1789	1805	1841	1832	1851	1882	1817	1834	1871
	NET	-383	-367	-331	-340	-321	-290	-355	-338	-301
2000	2372	1821	1843	1892	1867	1884	1926	1850	1873	1922
	NET	-551	-529	-480	-505	-488	-446	-522	-499	-450

Note: The asterisked column (*) represents the most likely scenario for this occupation in Manitoba.

A service target ratio of 1:630 was used based on the recommendations of the McKendry report.

Net Manpower Requirements

Exhibit B-19, opposite, shows the projected manpower requirements under each projection approach. The most likely scenario is based on the service target ratio of 1:630 under the medium population projection.

APPENDIX C

PHYSICIANS:

CONTROL OF PRACTICE

PHYSICIANS: CONTROL OF PRACTICE

Province	Certification/Licensing/Registration				
	Required Characteristics of Applicant	Certification Requirements	Licensing Requirements	Length of Training & Admission Requirements	Training Location / Educational Accreditation
British Columbia R.S. Chap.245	- satisfactory experience, good professional conduct and good character		- diploma from approved School of Medicine, - passes an examination on candidate fitness and capacity to practice	. 4 year degree program, . completed a minimum of 3 years in the Faculty of Arts of Science or the equivalent thereof including a number of specific courses	University of British Columbia
Alberta Chapter 26	- good character and reputation and - has not been struck off or suspended by any College of Physicians and Surgeons or similar body		- holder of degree in Medicine from an Alberta university and has satisfactorily served a period of post-doctoral training OR - holds a certificate of registration from the Medical Council of Canada and has served a period of training	- U of A: 4 year degree program . completed at least 2 years of university work approved by the Faculty of Medicine - U of C: 3 year degree program . a specified grade point average from at least 2 years of University training including a number of recommended courses	University of Alberta University of Calgary

PHYSICIANS: CONTROL OF PRACTICE

Province	Certification/Licensing/Registration					
	Required Characteristics of Applicant	Certification Requirements	Licensing Requirements	Length of Training & Admission Requirements	Training Location	Educational Accreditation
Saskatchewan Bill 80 of 1981	- good character and good standing as a practitioner if he was entitled to practice		- registered in the Canadian Medical Register OR - completion of the Federation Licensing Examinations of the United States and is a graduate of Medicine of an approved University and has completed satisfactory postgraduate training	5 year degree program (5th yr. comprised of a Junior Rotating Internship) - good moral character and Senior Matriculation plus University courses in Biology, Chemistry, Physics, a language and an elective	University of Saskatchewan	
Manitoba Chapter 11			- possesses one or more of the qualifications and has completed a prescribed postgraduate training program	. 4 year degree program - senior matriculation plus a year in a University program with courses completed in English, Physics, Chemistry, Bio-chemistry and Biology	University of Manitoba	

APPENDIX D

BIBLIOGRAPHY

APPENDIX D

BIBLIOGRAPHY

ARTICLES

"A Basis for Medical Manpower Cuts" New Zealand Medical Journal, Vol. 89, pp. 480-1, June 27, 1979.

Aiken, Linda, H. "Physicians: How Many Do We Need?" Annals of Internal Medicine, Vol. 93, pp. 135-6, July 1980.

Banerjee, A.K. "The Problem of Medical Manpower in India" World Medical Journal, Vol. 16, 1969.

Beck, L.C.; Kalogredis, V.J.; and Anders, G.T. "Increase in physicians affects practice arrangements" Pennsylvania Medicine, pp. 28-30, June 1980.

Begun, James W. "Refining Physician Manpower Data" Medical Care, Vol. 15, pp. 780-6, Sept. 1977.

"Behind Worries Over a Glut of Doctors" U.S. News & World Report, Vol. 89, p. 60, July 28, 1980.

Bloom, B.S.; and Peterson, O.L. "Physician Manpower Expansionism: A Policy Review" Annals of Internal Medicine, Vol. 90, pp. 249-56, Feb. 1979.

Davies, R.E. "The Problem of Medical Manpower in Rural Australia" World Medical Journal, Vol. 16, 1969.

Dickinson, G.T., ed. "Conference on Medical Manpower" The Canadian Medical Association Journal, Vol. 97, pp. 1555-77, Dec. 1967.

Dickson, David "An excess of doctors..." Nature, Vol. 285, p.2, May 1980.

Donaldson, W.F. "Graduate Education in Surgery" Bulletin of the American College of Surgeons, Vol. 66, pp. 12-18, March 1981.

Dunn, J.W.; and Doeksen, G.A. "Canonical Correlation Analysis of Selected Demographic and Health Personnel Variables" Southern Journal of Agricultural Economics, pp. 95-9, July, 1977.

Ellwood, Paul M. Jr.; and Ellwein, L.K. "Physician glut will force hospitals to look outward" Hospitals, Vol. 55, pp. 81-5, Jan. 1981.

Evans, R.G.; Parish, E.M.A.; and Sully, Floyd "Medical Productivity, Scale Effects, and Demand Generation" Canadian Journal of Economics, Vol. 6, pp. 376-93, August 1973.

Geekie, D.A. "Why the government is wrong in being indifferent to exodus of doctors" CMA Journal, Vol. 121, p. 79, July 7, 1979.

Gerber, Alex "The Medical Manpower Shortage - A World-Wide Problem" World Medical Journal, Vol. 16, 1969.

Ginzberg, Eli "A reply to the commentaries on 'The sacred cows of health manpower': A second view" Man and Medicine, Vol. 3, pp. 147-51, 1978.

Gish, Oscar; and Godfrey, Martin "A reappraisal of the 'Brain Drain' - With Special Reference to the Medical Profession" Social Science & Medicine, Vol. 13C(1), March 1979.

Gwee, A.L. "The Assessment of Medical Manpower Needs" World Medical Journal, Vol. 16, 1969.

Hadley, Jack "Alternative Methods of Evaluating Health Manpower Distribution" Medical Care, Vol. XVII, pp. 1054-60, Oct. 1979.

Haglund, Keith "The 'GMENAC' Panel Recommends Severe Cutbacks" The New Physician, pp. 25-7, November 1980.

"Health Manpower Planning in the Americas" WHO Chronicle, Vol. 29, pp. 85-90, Jan. 1975.

Holoweiko, Mark "How States Plan to Regulate Physician Supply" Medical Economics, Vol. 57, pp. 79-84, Apr. 28, 1980.

Holden, William D. "The Impact of GMENAC" Bulletin of the American College of Surgeons, Vol. 64, pp. 9-12, March 1979.

Honey, Rick B. "Too Many Doctors? - An economist assesses physician supply and demand" Patient Care, pp. 168-85, Sept. 1980.

Inglis, F.G. "Physician Manpower Planning: An Urgent Problem" The Canadian Journal of Surgery, Vol. 21, pp. 7-8, Jan. 1978.

Katz, Martha; Warner, David C.; and Whittington, Dale "The Supply of Physicians' Incomes: Some Projections" Journal of Health Politics, Policy and Law, Vol. 2, pp. 227-56, Summer 1977.

Kirchner, M. "Doctor Surplus - What 1990 Will Look Like" Medical Economics, Vol. 57, pp. 54-68, Sept. 29, 1980.

Korcok, Milan "Canadian Internships May Not be Recognized for Licensure in the US" CMA Journal, Vol. 124, pp. 204-10, Jan. 15, 1981.

Korcok, Milan; Geekie, D.A. "Report Issued by Requirements Subcommittee of National Committee on Physician Manpower" CMA Journal, Vol. 115, pp. 265-73, August 7, 1976.

Korcok, Milan "Physician Emigration part I: How Those Who Move South are Recruited" CMA Journal, Vol. 118, pp. 980, 985-6, Apr. 22, 1978.

Korcok, Milan "Physician Emigration part II: Where Those Who Move South Go" CMA Journal, Vol. 118, pp. 1156-8, May 6, 1978.

Lane, P.L.; Rowe, H.E.; and Lewis, D.R. "Job Opportunities in Canada for Newly Certificated Physicians" CMA Journal, Vol. 121, pp. 213-9, July 1979.

LaViolette, Suzanne "M.D. Surplus - a Dream, or Letdown?" Modern Healthcare, Vol. 10, pp. 34-6, Dec. 1980.

"Low Morale Spurs Canada's Brain Drain" Health Care, Vol. 22, p. 5, Feb. 1980.

Madison, Donald L. "Managing a Chronic Problem: The Rural Physician Shortage" Annals of Internal Medicine, Vol. 92, pp. 852-4, June 1980.

Mattera, M.D. "Will More Doctors Mean That You'll Earn Less?" Medical Economics, Vol. 55, pp. 182-97, May 15, 1978.

"Medical Manpower in Australia" Medical Journal of Australia, Vol. 1, pp. 194-6, Mar. 8, 1980.

Mejia, Alfonso "Migration of Physicians and Nurses: a World-Wide Picture" International Journal of Epidemiology, Vol. 7, pp. 207-15, Sept. 1978.

Neuhauser, Duncan "Comparing the Financial Options" The Internist, pp. 9-10, March 1980.

Neville, R.J.W. "Where Have All the People Gone? The Population Datum for Medical Manpower Requirements" New Zealand Medical Journal, Vol. 91, pp. 54-8, Jan. 23, 1980.

Parkhouse, J. "Medical Manpower in Britain. 1. The Background" Medical Education, Vol. 12, pp. 40-62, Jan. 1978.

Parkhouse, J. "Medical Manpower in Britain. III. Actual manpower developments in relation to predictions and recommendations" Medical Education, Vol. 12, pp. 133-58, Jan. 1978.

Parkhouse, J. "Medical Manpower in Britain. V. The Future" Medical Education, Vol. 12, pp. 230-52, May 1978.

Rayack, Elton "The Shortage of Physicians' Services" Industrial and Labor Relations Review, Vol. 18, pp. 584-7, July 1965.

Rayack, Elton "The Supply of Physicians' Services" Industrial and Labor Relations Review, Vol. 17, pp. 221-37, January 1964.

Richards, R.K.; and Eward, A.M. "What Medical Education is Doing to Provide Physicians for Michigan" Michigan Medicine, Vol. 79, pp. 77-8, Feb. 1980.

Roddy, Pamela C. "Need-Based Requirements for Primary Care Physicians" JAMA, Vol. 243, pp. 355-8, Jan. 25, 1980.

Rosen, R.H.; Heins, M.; and Martindale, L.J. "Practice Plans of Today's Medical Students" Journal of Medical Education, Vol. 56, ppp. 57-9, Jan. 1981.

Roybal, Edward R. "Minorities in Medicine: The Next Decade: Journal of Medical Education, Vol. 54, pp. 652-5, Aug. 1979.

Russell, W. "Medical Education, Manpower, and Unemployment" British Medical Journal, Vol. 282, p. 580, Feb. 1981.

Sanazaro, P J. "How will Quantity Affect Quality?" The Internist, pp. 7-8, March 1980.

Sandosham, A.A. "Medical Manpower in Rapidly Expanding Population" World Medical Journal, Vol. 16, 1969.

Scheffler, R.M.; Yoder, S.G.; Weisfeld, N.; and Ruby, G. "Physicians and New Health Practitioners: Issues for the 1980s" Inquiry, Vol. 16, pp. 195-229, Fall. 1979.

Schwartz, Harry "Keeping Up with the Competition" The Internist, pp. 5-6, March 1980.

Schwartz, W.B.; Newhouse, J.P.: Bennett, B.W.; and Williams, A.P. "The Changing Geographic Distribution of Board-Certified Physicians" New England Journal of Medicine, Vol. 303, pp. 1032-8, Oct. 30, 1980.

Simler, Sheila L. "Medical Graduate Cutbacks Could Spur Resident, Physician Shortages" Modern Healthcare, Vol. 9, pp. 26, 33-4, Nov. 1980.

Sloan, Frank A. "Physician Supply Behavior in the Short Run" Industrial and Labor Relations Review, Vol. 28, pp. 549-69, July 1975.

Sun, Marjorie "Too Many Doctors in the House" Science, Vol. 210, pp. 756-7, Nov. 1980.

"The Coming Crisis in Medical Manpower" New Zealand Medical Journal, pp. 280-2, Oct. 8, 1980.

"Too Many Doctors in Australia?" New Zealand Medical Journal, Vol. 90, pp. 14-5, July 11, 1979.

"Trends in Medical Manpower" WHO Chronicle, Vol. 29, pp. 46-8, Jan. 1975.

Wallace, Helen M. "Women in Medicine" JAMWA, Vol. 35, pp. 201-11, Aug./Sept. 1980.

Ward, A.W.M. "Older Women Entrants to Medicine" Medical Education, Vol. 15, pp. 57-60, Jan. 1981.

White, M.S. "The Oversupply of Physicians: Implications for Hospital Planning" Hospital Progress, Vol. 62, pp. 28-31, Feb. 1981.

Williamson, Joan "Today's Students in Medicine: A Look at the Work of GMENAC" Group Practice Journal, pp. 17-9, February 1980.

REPORTS

National Committee on Physician Manpower. Requirements for Physicians in Canada: Report of the Requirements Committee. 3v. Ottawa: Health and Welfare Canada. 1975 (Chairman: Dr. J. B. R. McKendry; Co-chairman: Dr. N.T. McPhedran)

Alberta Health Care Insurance Plan.
- Annual Report - Year Ended March 31, 1978
- Annual Report - Year Ended June 30, 1977
- Annual Report - Year Ended June 30, 1976
- Annual Report - Year Ended June 30, 1975
- Annual Report - Year Ended June 30, 1974
- Annual Report - Year Ended June 30, 1973
- Alberta Physician Fee Schedule - March 1, 1981

Alberta Health and Social Services Disciplines Committee.
- Health and Social Service Manpower in Alberta, 1980
- Health and Social Service Manpower in Alberta, 1979

Alberta Hospitals and Medical Care.
- Annual Report - Year Ended March 31, 1979
- Annual Report - Year Ended March 31, 1980
- Annual Report 1979/80

Alberta Hospital Utilization Committee. A Report to the Minister of Hospitals and Medical Care. Hospital Utilization. March 1981.

Angus, Douglas E. A Study of Medical Manpower in Alberta 1963-72. February 1976.

Applied Management Sciences, Incorporated. Manpower/Population Ratios for Calculating Needs Standards. May 21, 1976.

Association of Canadian Medical Colleges. Canadian Medical Education Statistics 1977/78 and 1978/79.

Boulet, Jac-Andre and Grenier, Gilles. Economic Council of Canada. Health Expenditures in Canada and the Impact of Demographic Changes on Future Government Health Insurance Program Expenditures. October 1978.

Canadian Medical Association. Basis of Accreditation for Educational Programs in Allied Medical Disciplines. Effective September 1979.

Council of Ontario Faculties of Medicine. Postgraduate Manpower Committee. Status of the Postgraduate Programs in Medicine in Ontario in the Academic Year 1980-81.

Council of the College of Physicians and Surgeons, Province of Alberta. Medical Directory March 1st, 1981.

Department of National Health and Welfare. Task Force Reports on the Cost of Health Services in Canada November 1969.

Faculties of Medicine of The University of Alberta and The University of Calgary. Report to the Department of Hospitals and Medical Care on Graduate Medical Education in the Faculties of Medicine in Alberta - April, 1979.

Gouvernment du Quebec. Rapport du Comite d'etude de Rationalisation des Programmes de specialisation Medicale - Septembre 1980.

Government of Saskatchewan. Annual Report 1979-80.

Hons, R. Report on Nephrology Manpower: Submitted to be Canadian Society of Nephrology. Sept. 1981. (Unpublished).

Hiestand, Dale L., Ostow, Miriam. (Ed.) Health Manpower Information for Policy Guidance.

Manitoba Department of Health and Community Services. Health Manpower Provincial Report - Manitoba 1979.

Manitoba Health Services Commission.
Annual Report 1978-79. June 1979.
Annual Report 1975. March 1976.
Annual Report - Year Ended December 31, 1971.
Annual Report - Year Ended December 31, 1973.
Annual Report - Year Ended December 31, 1972
Annual Statistics 1978/79.
Annual Statistics 1977/78.
Annual Statistics 1976.
Health Utilization Data - Manitoba 1972-76.

Manitoba Health Services Insurance Plan. Health Services Commission. Physician's Manual - April 1, 1980.

Ministry of Health, British Columbia. Manpower Implications Derived from Payments by the Medical Services Commission to Physicians in British Columbia. March 1978.

Ministry of Health. Province of British Columbia. Medical Services Commission. Payment Schedule - April 1, 1980.

Muzondo, Timothy R., Pazderka, Bohumir. Professional Licensing and Competition Policy: Effects of Licensing on Earnings and Rates-Of-Return Differentials. April 1979.

Ontario Ministry of Health. Strategic Research and Manpower Planning Branch. Health Manpower in Ontario. October 1980.

Province of Manitoba. Medical Manpower Committee Report.

Province of British Columbia. Ministry of Health. Report of the Advisory Committee on Medical Manpower.

Province of British Columbia. Health Manpower Working Group.
Selected Tables of Directory Active Physicians by RHD by Community as at September 1977 and September 1978. October 1978.
Analysis of Changes in Non Post-Graduate Physicians from September 1975 to September 1977. July 1978.

Pickering, Edward A. Report of the Special Study Regarding the Medical Profession in Ontario. April 1973.

Rafferty, John. Health Manpower and Productivity. Lexington Books.

Robertson, H. Rocke. Houwing, J.F. Michaud, L.F. Association of Universities and Colleges of Canada. Health Manpower Output of Canadian Educational Institutions. May 1973.

Saskatchewan Health.
Annual Report - 1979-80
Annual Report - 1978

Saskatchewan Medical Care. Insurance Commission. Payment Schedule - April 1, 1980.

University of Alberta and The University of Calgary. Faculties of Medicine. Report to the Department of Hospitals and Medical Care on Graduate Medical Education in the Faculties of Medicine in Alberta. April 1979.

University of British Columbia, Division of Health Services Research and Development. Rollcall 79: A Status Report of Health Personnel in the Province of British Columbia, March, 1980.
Rollcall Update 80: A Status Report of Selected Health Personnel in the Province of British Columbia, 1980.

U.S. Department of Health, Education and Welfare.
A Report to The President on the Status of Health Professions Personnel in the United States. August 1978.
Effects of Task Delegation on the Requirements for Selected Health Manpower Categories in 1980, 1985, and 1990. May 1974.
1990 Manpower Requirements in Eight Surgical Specialties. April 1979-February 1980.
Review of Health Manpower Population Requirements Standards
Report of the Gradual Medical Education National Advisory Committees to the Secretary. September 1980.
Trends Affecting the U.S. Health Care System. January 1976.